# BigFix Runbook AI
# Pre-Requisite Guide
Version 6.3

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# Document Revision History

This guide is updated with each release of the product or when necessary.

This table provides the revision history of this Pre-Requisite Guide.

| Version Date | Description |
|---|---|
| **March, 2023** | BigFix Runbook AI v6.3 Pre-Requisite Guide |
| **July, 2023** | BigFix Runbook AI v6.3 Pre-Requisite Guide |

# 1 Preface

This section provides information about the HCL BigFix Runbook AI Pre-Requisite Guide and includes the following topics:



## 1.1 Intended Audience

This information is intended for administrators responsible for installing BigFix Runbook AI and infrastructure administrators responsible for provisioning infrastructure required for installation of BigFix Runbook AI.

## 1.2 About this Guide

This guide provides instructions to install the prerequisites required for BigFix Runbook AI. This includes the installation of MongoDB and Solr for both HA (High Availability) and non-HA modes as well as generation of certificates for authentication and authorization purposes.

## 1.3 Related Documents

The following documents can be referenced in addition to this guide for further information on the BigFix Runbook AI platform.

- BigFix Runbook AI Installation Guide

# 1.4 Conventions

The following typographic conventions are used in this document:

Table 1 - Conventions

| Convention | Element |
|---|---|
| **Boldface** | Indicates graphical user interface elements associated with an action, or terms defined in text or the glossary |
| Underlined Blue Face | Indicates cross-reference and links |
| *Italic* | Indicates document titles, occasional emphasis, or glossary terms |
| `Courier New` (Font) | Indicates commands within a paragraph, URLs, code in examples, and paths including onscreen text and text input from users |
| Numbered lists | Indicates steps in a procedure to be followed in a sequence |
| Bulleted lists | Indicates a list of items that is not necessarily meant to be followed in a sequence |

# 2 Pre-requisites for BigFix Runbook AI Component

This section provides an overview of the prerequisites to run the BigFix Runbook AI installer. Once the infrastructure is ready, determine the server where the installer will be executed. Each type of server – Web Server, Application Server, Advanced AI Server and Database Server have different prerequisites depending on the components being installed. Once you have identified the required servers, components, and the deployment mode, please proceed with the installation of the pre-requisite software and utilities.

This documentation is only for Windows 2012 R2 and higher versions.

The following table describes the software requirements to install the components.

Table 2 – Software Requirements

| Server | Component | Sub-Components | Software Requirements |
|---|---|---|---|
| Web Server | Web Component | - Web UI<br>- Key Rotation Service | - IIS 10.0 or above<br>- Dot Net Framework 4.8.x<br>- Microsoft ACE OLEDB 12.0 |
| Application Server | Application Component – Microsoft Dot Net | - Data Collector<br>- RBA Executor<br>- Generic Executor<br>- Release<br>- Generic Listener | - Dot Net Framework 4.8.x<br>- Python 3.8.10 64-bit<br>- NLTK 3.4.1<br>- OpenSSL-Win64<br>- Apache Server 2.4<br>- VC++ 2015 64-bit Redistributable package<br>- AntiWord<br>- Spacy 3.1.2<br>- Numpy 1.20.3<br>- Mod_wsgi 4.9.0<br>- En_core_web_sm 3.1.0 |
| | Application Component - Python | - iParse<br>- iUnique<br>- iRecommend | |
| Advanced AI Server | Advanced AI Component - Python | - iScrape<br>- iKnowledge | - Python 3.8.10 64-bit<br>- NLTK 3.4.1<br>- OpenSSL-Win64 |

| Server | Component | Sub-Components | Software Requirements |
|---|---|---|---|
| | | - Advanced Knowledge<br>- Knowledge Rating | - Apache Server 2.4<br>- VC++ 2015 64-bit Redistributable package<br>- AntiWord<br>- Spacy 3.1.2<br>- Numpy 1.20.3<br>- Mod_wsgi 4.9.0<br>- En_core_web_sm 3.1.0<br>- Google Chrome Browser<br>- Oracle Distribution of Java JDK 1.8.x (Required only for Solr installation) |
| Database Server | Database | Transactional Database | MS SQL 2016 /MS SQL 2022 (+) Enterprise / Standard edition 64 bit |
| MongoDB | Document Storage | MongoDB | MongoDB 4.0 |
| SOLR | Indexer | SOLR | - SOLR 8.5.0<br>- nssm 2.24 |
| Certificates (applicable for all tiers) | | | SSL Certificates |

## 2.1 IIS

Table 14 – IIS Requirements

| | |
|---|---|
| Version | 10.0 or above |
| Purpose | It is used as a server for website hosting |
| Source | Part of Windows feature sets |

### 2.1.1 Installation Procedure

1. Open Control Panel.
2. Search for '**Windows feature'.** It will feature under **Programs.**
3. Click **Turn Windows Features On or Off**.


Figure 18 - IIS Installation Procedure

4. Click **Next**.

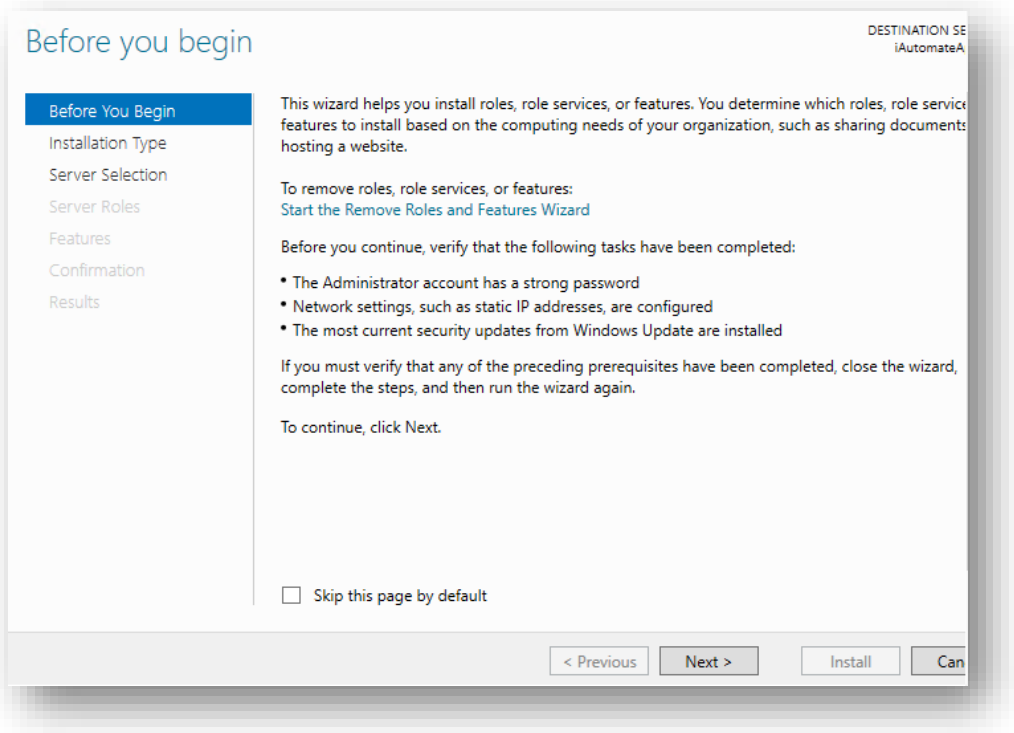


Figure 1 - IIS Installation Procedure (Cont.)

5. Click **Next**

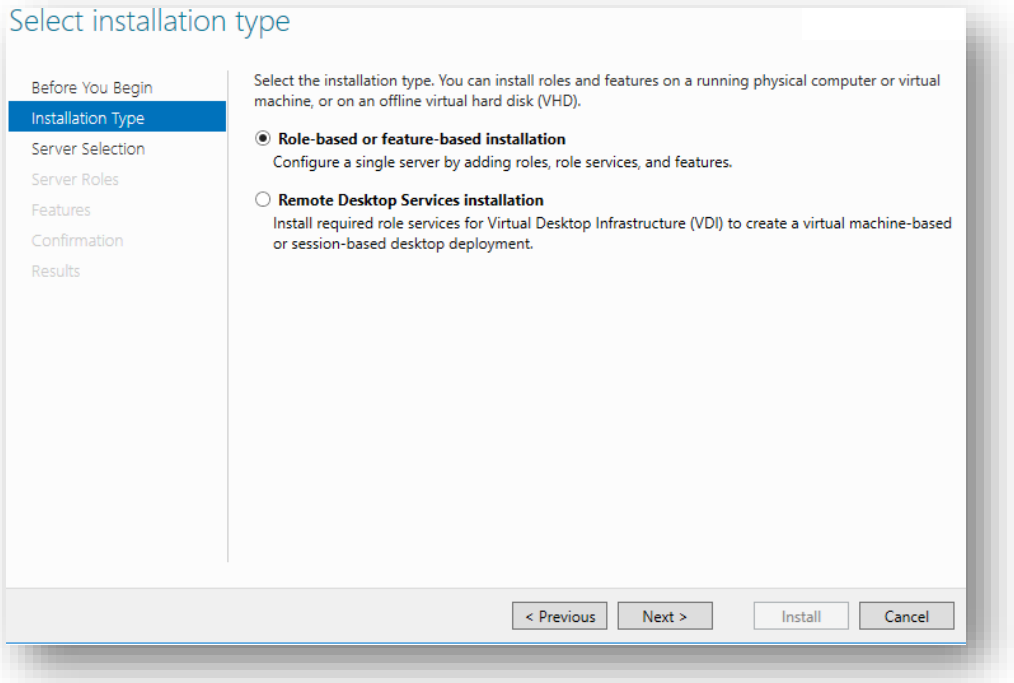


Figure 2 - IIS Installation Procedure (Cont.)

6. Click **Next**.

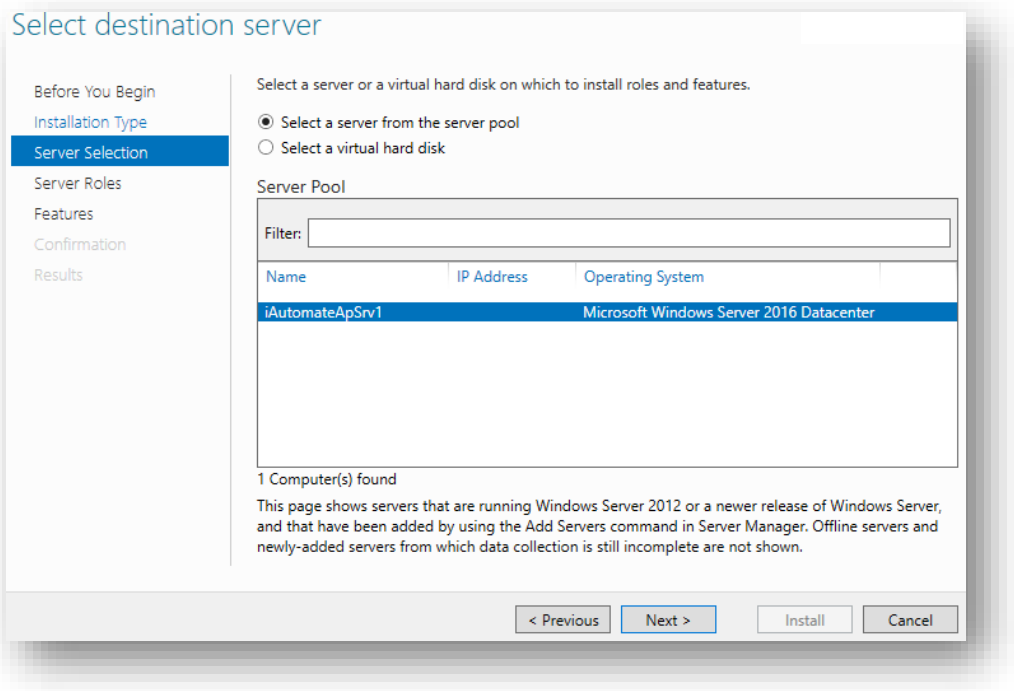


Figure 3 - IIS Installation Procedure (Cont.)

7. Select **Web Server (IIS)** and click **Next**.

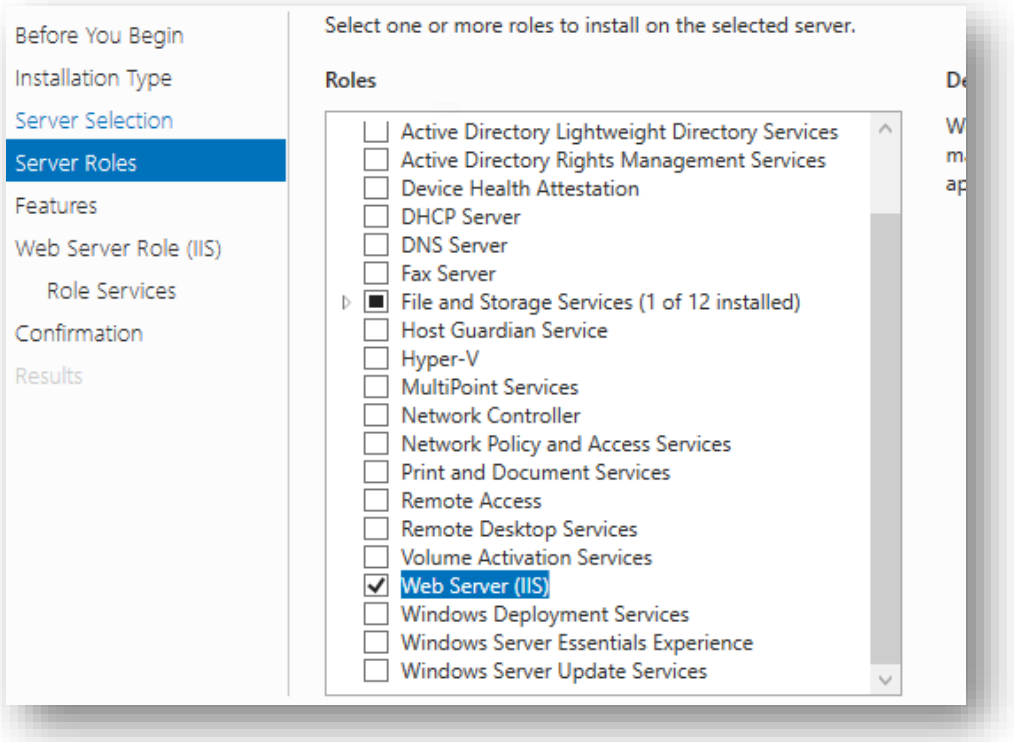


Figure 4 - IIS Installation Procedure (Cont.)

8. Select **.NET framework 3.5 Features**.

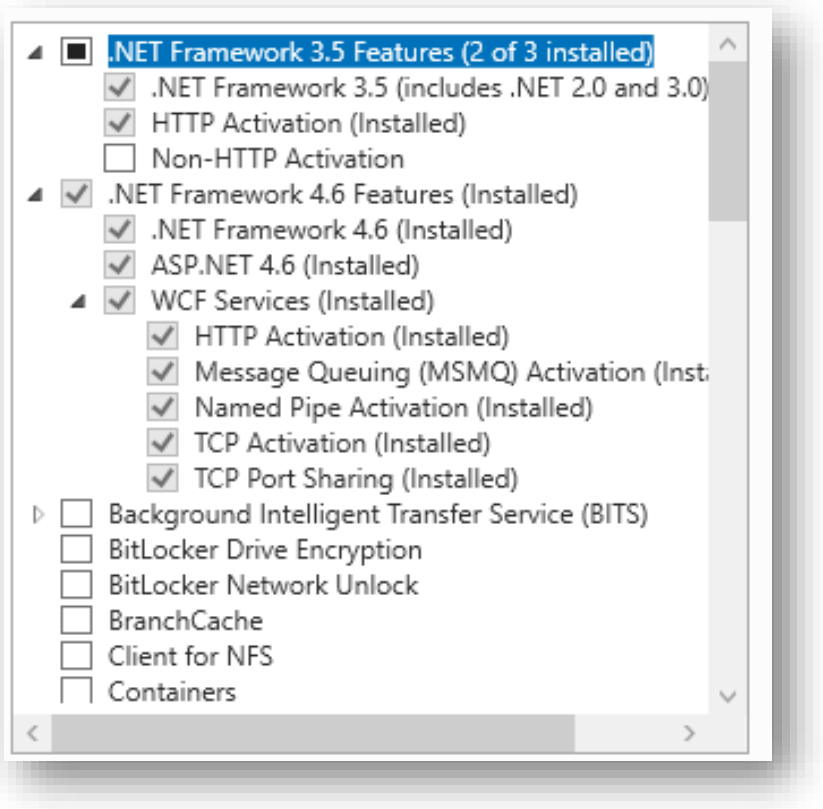


Figure 5 - IIS Installation Procedure (Cont.)

9. Click **Next** for installing IIS.

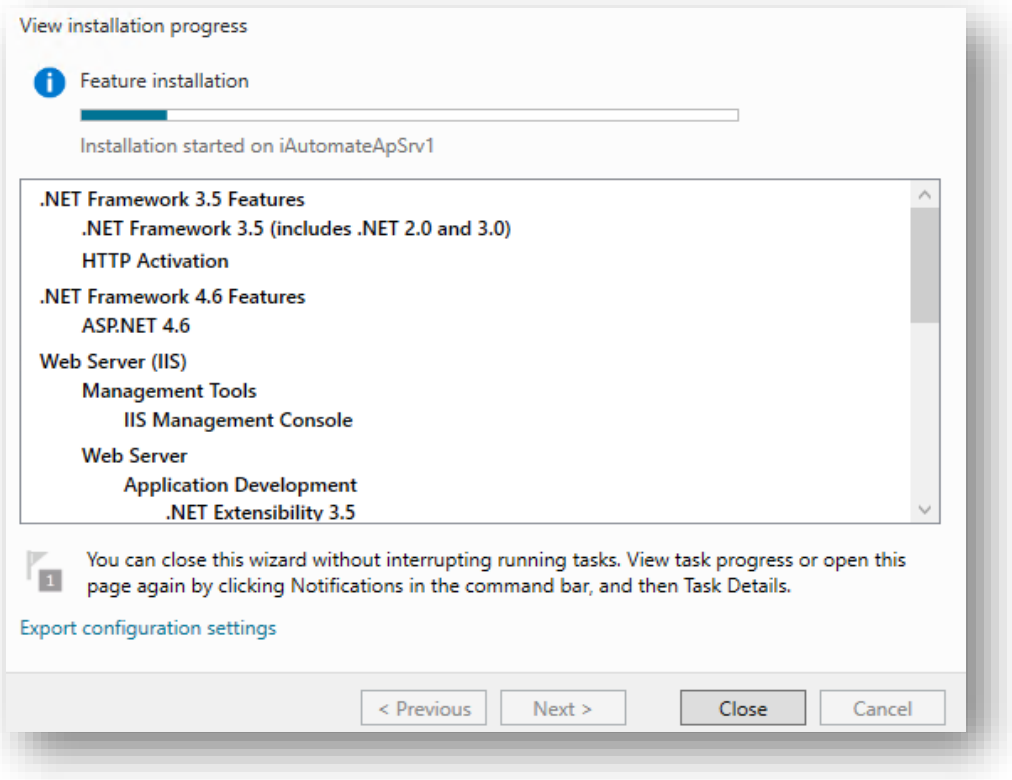


Figure 6 - IIS Installation Procedure (Cont.)

10. Open **Control Panel** and search for **'Windows feature'.** It will feature under **Programs.**
11. Click **Turn Windows Features on or off**.


Figure 7 - IIS Installation Procedure (Cont.)

12. Click **Next** and expand the **Web Server (IIS).**

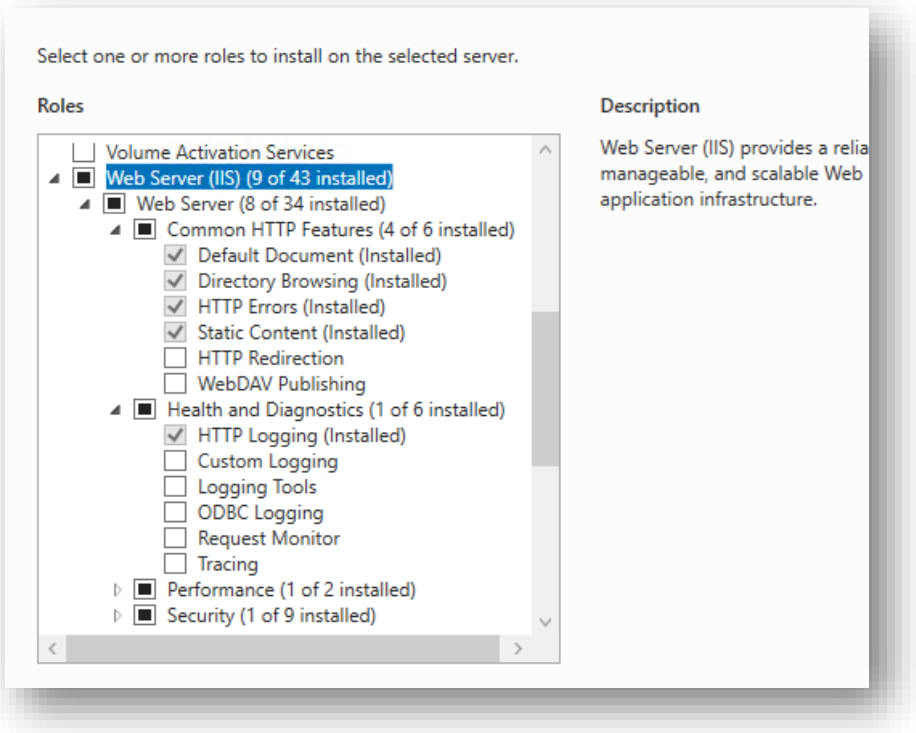


Figure 8 - IIS Installation Procedure (Cont.)

13. Expand **Application Development** and select features as shows in the image below.

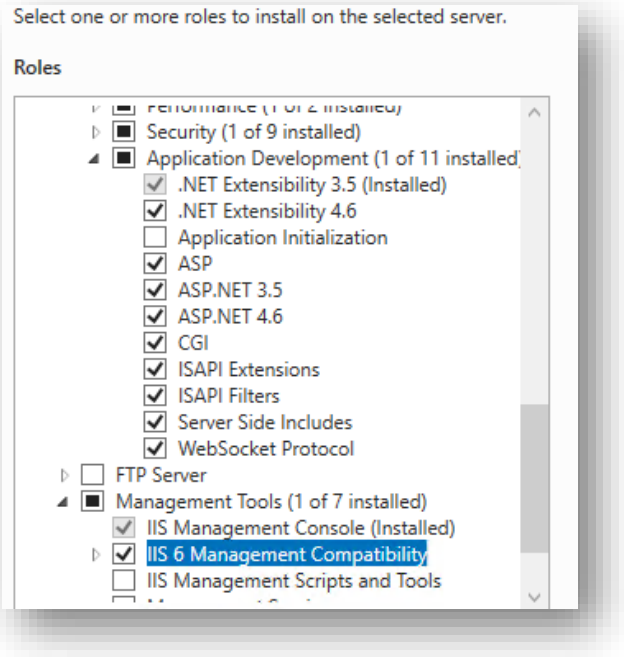


Figure 9 - IIS Installation Procedure (Cont.)

14. Click **Next** to proceed with installation.

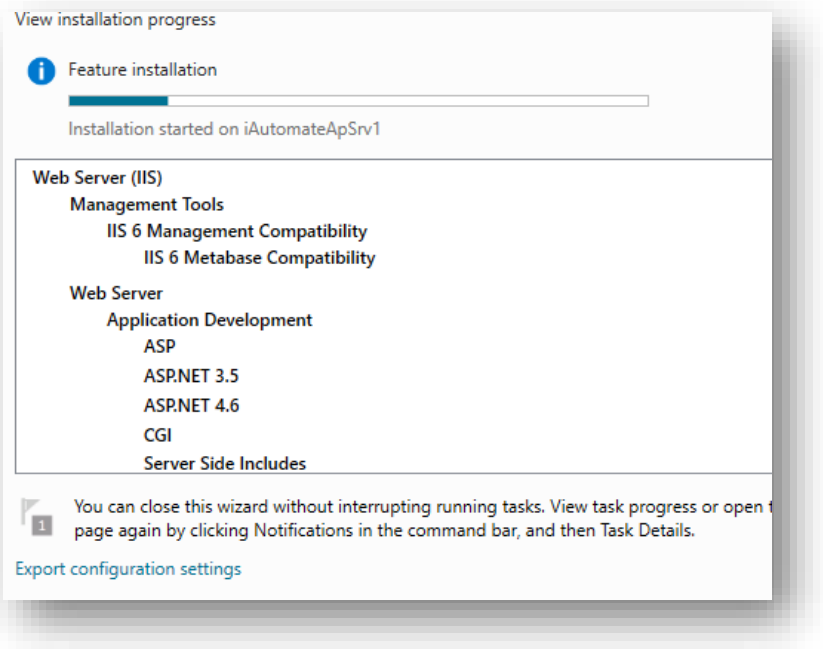


Figure 10 - IIS Installation Procedure (Cont.)

15. To validate successful installation of IIS, type **Run** in **Windows Search Bar** and Press **Enter.**
16. Type '**inetmgr'** and click **Enter**. Once the installation is successful, the following screen pops up to confirm the installation of IIS.

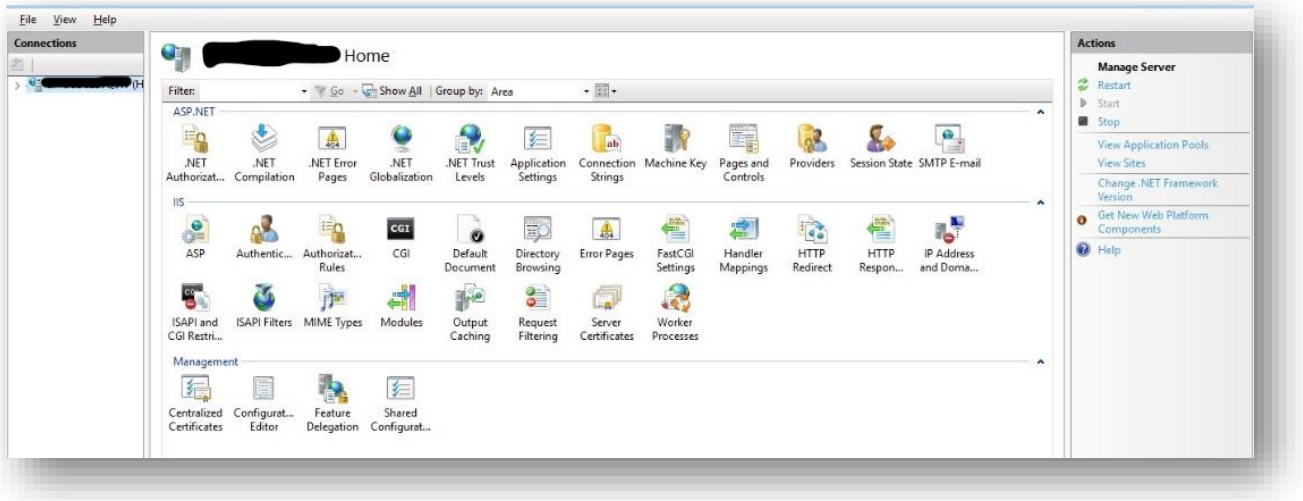


Figure 11 - IIS Installation Procedure (Cont.)

For any issue follow below link for window 2016
https://www.rootusers.com/how-to-install-iis-in-windows-server-2016/
For any issue follow below link for window 2019
https://www.rootusers.com/how-to-install-iis-in-windows-server-2019/

https://learn.microsoft.com/en-us/iis/application-frameworks/scenario-build-an-aspnet-website-on-iis/configuring-step-1-install-iis-and-asp-net-modules

## 2.2 Dot NET Framework- 4.8:

Table 3 - Update .Net Framework 4.8

| | |
|---|---|
| Version | .NET Framework 4.8 |
| Source | Available as part of BigFix Runbook AI installer package.<br>Package Name →.NETFRAMEWORK4.8.zip<br>Available as part of BigFix Runbook AI installer package |

Use the links below in case of any help require to install and error fixing:

https://help.salesforce.com/s/articleView?id=sf.cg_modeler_ibe_install_dotnet.htm&type=5

https://learn.microsoft.com/en-us/dotnet/framework/install/

## 2.3 Microsoft ACE OLEDB 12.0

Table 4 – Microsoft ACE OLED 12.0 Requirements

| | |
|---|---|
| Version | 12.0 |
| Purpose | It is used to download the runbook metadata format |
| Source | Available as part of iAutomate installer package<br>Follow the below path for 32 bit machine:<br>• Pre-Requisite Software  AccessDatabaseEngine.exe<br>Follow the below path for 64 bit machine:<br>• Pre-Requisite Software  AccessDatabaseEngine_X64.exe |

### 2.3.1 Installation Procedure

1. Refer the file from the source field mentioned in the table above and run the exe.

## 2.4 Python

Table 5 – Python Details

| | |
|---|---|
| Version | Python 3.8.10 |
| Purpose | All AI components of BigFix Runbook AI requires python as pre-requisite. |
| Source | Available as part of BigFix Runbook AI installer package. Follow the below path:<br><br>Pre-Requisite Software → python-3.8.10-amd64.exe |

### 2.4.1 Installation Procedure

1. Download the file **python-3.8.10-amd64.exe** from the Path mentioned in the source field of Table 5 – Python Details. For installation, double click on **python-3.8.10-amd64.exe** file.
2. Create new folder Python38 with path "**C:\Python38"** if not already existing.
3. During the installation, browse for the location i.e., **C:\Python38** and then click **Next**.
4. Select option **Install Python** for all users.

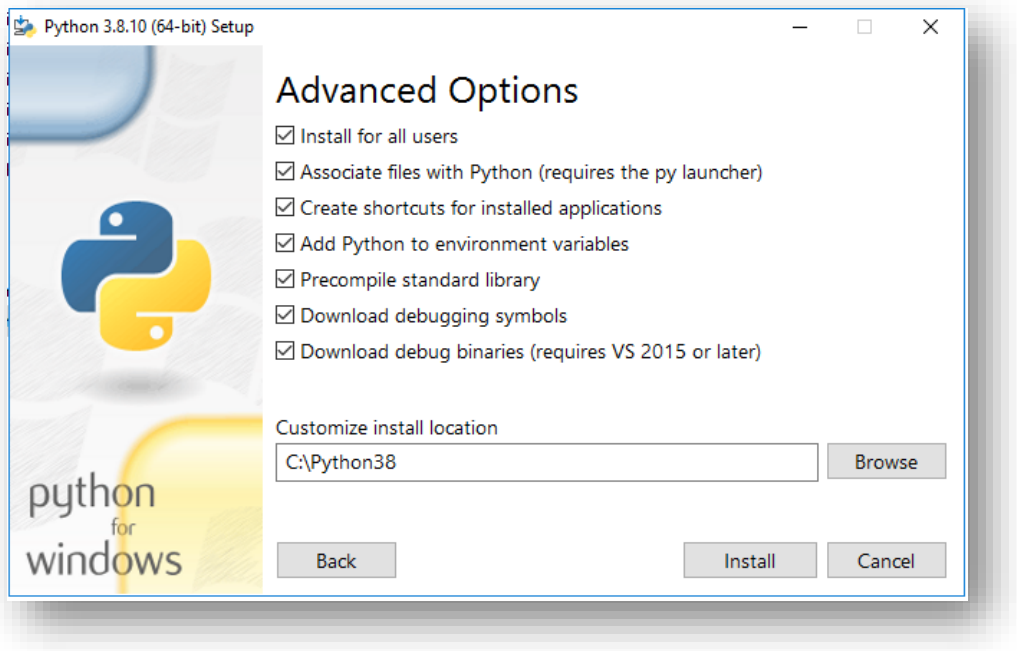


Figure 12 - Python Installation

5. The system environment variable **PYTHON_HOME** needs to be set with the path ***C:\Python38***.
6. Add below paths to system variable **Path**:

- C:\Python38
- C:\Python38\Scripts

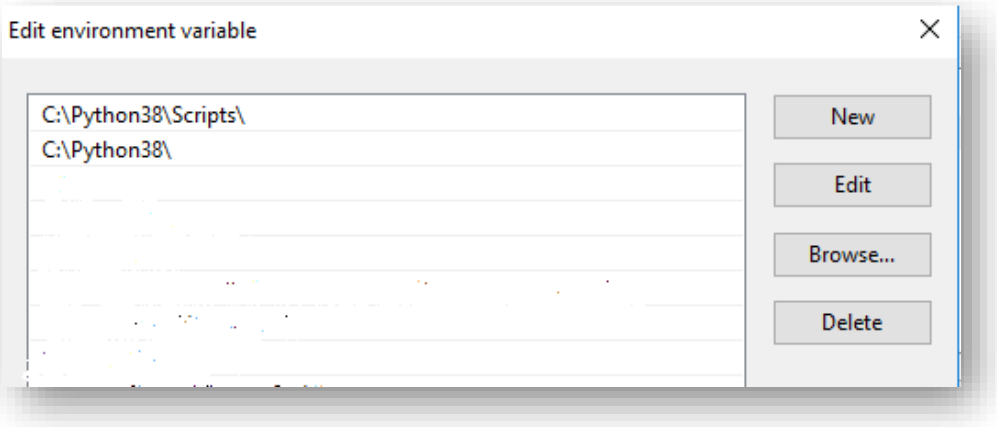


Figure 13 - System Variable Screen

Please ensure the path added to PYTHON_PATH and Path variable don't have '\' appended at the end.

7. To validate successful installation of Python, perform the below steps:
   a. Open the Command Prompt as Administrator, type python and press Enter.

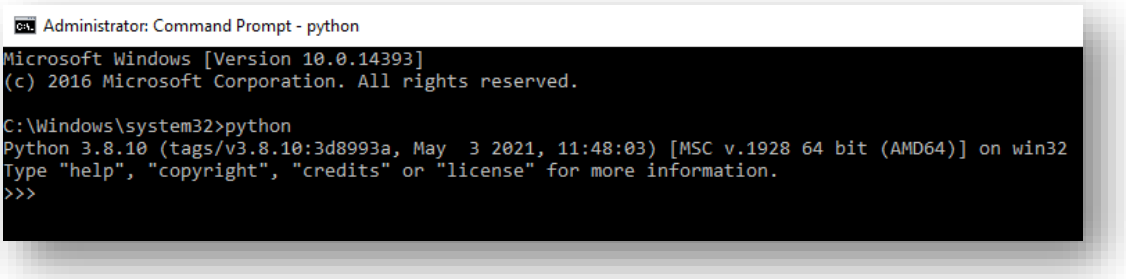


Figure 14 - Python Shell

   b. If Python installation is successful, the Python Version will be displayed. If Python installation was not successful, then the below screen is displayed.

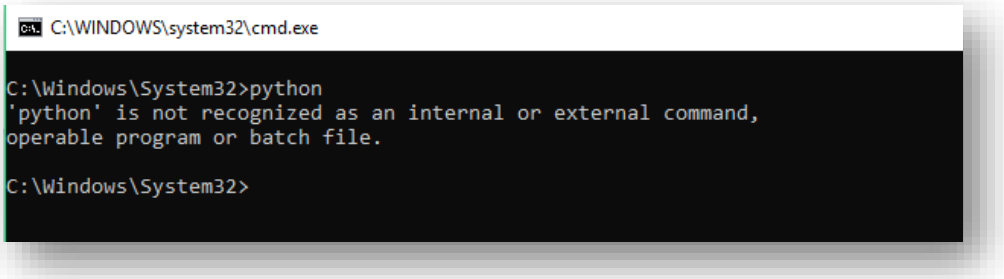

Figure 15 - Command window- Unsuccessful installation of Python

## 2.5 NLTK package

Table 6 - NLTK Requirements

| | |
|---|---|
| Version | 3.4.1 |
| Purpose | This package is used by BigFix Runbook AI for Natural Language Processing tasks. |
| Source | Available as part of BigFix Runbook AI installer package. Follow the below path:<br>Pre-Requisite Software → nltk_data.zip |

### 2.5.1 Installation Procedure

1. Download the file **nltk_data.zip** from the Path mentioned in the source field of Table 6 - NLTK Requirements.
2. Extract the contents of the zip file in the given path: **C:\nltk_data.**

## 2.6 Open SSL Package

Table 7 – SSL Package Requirements

| | |
|---|---|
| Purpose | It is required for the creation of certificates. Please note that certificates generated by these steps are self-signed certificates only. If you are looking for CA signed certificates, then contact the concerned stakeholders from customer. |
| Source | Available as part of BigFix Runbook AI installer package. Follow the below path:<br>Pre-Requisite Software → OpenSSL-Win64.zip |

### 2.6.1 Installation Procedure

1. Download the file **OpenSSL-Win64.zip** from the Path mentioned in the source field of Table 7 – SSL Package Requirements.
2. Extract the contents of the zip file in the path **C:\OpenSSL-Win64.**
3. Set the system environment variable with name **OPENSSL_CONF** with the path as:

```
C:\OpenSSL-Win64\bin\openssl.cfg
```

4. In the system environment variable name as "**Path**", add the following:

```
C:\OpenSSL-Win64\bin
```

## 2.7 Apache Server

Table 8 – Apache Server Requirements

| | |
|---|---|
| Version | 2.4 |
| Purpose | Apache Server is used to release features of AI components as REST APIs. This also creates window service for all python components. |
| Source | Available as part of BigFix Runbook AI installer package. Follow the below path:<br>Pre-Requisite Software → Apache24.zip<br>Certificate Path - Available as part of BigFix Runbook AI installer package.<br>Follow the below path:<br>Pre-Requisite Software → Python certificate.zip<br>Follow the below path for DLL<br>• Pre-Requisite Software → HCL.iAutomate.EncryptDecrypt.dll<br>• Pre-Requisite Software → Newtonsoft.Json.dll |

### 2.7.1 Installation Procedure

1. Download the file **Apache24.zip** from the Path mentioned in source field of Table 8 – Apache Server.
2. Extract the contents of zip file. It should be placed in the given path: ***C:\Apache24***.
3. Add the system environment variable ANT_HOME with the path ***C:\Apache24***
4. To the system environment **Variable Path**, add the below paths:
   - C:\Apache24\bin
   - C:\Apache24
5. Before starting any of the services, make sure the following DLL files are present in the path ***C:\Apache24\bin***.
   - HCL.iAutomate.EncryptDecrypt.dll
   - Newtonsoft.Json.dll

DLL will be updated as soon as any change occurs.

6. Download the certificates from the Path mentioned in Table 8 – Apache Server. After unzipping the certificates, copy them to **C:/Program Files/certificate** folder.
7. Open the **Command Prompt** as **Administrator** and run the following command to install the Apache Service:

```
httpd -k install
```

8. Go to **Run (Windows + R)** and type **services.msc** and start the apache service if the status is not already **Running**.

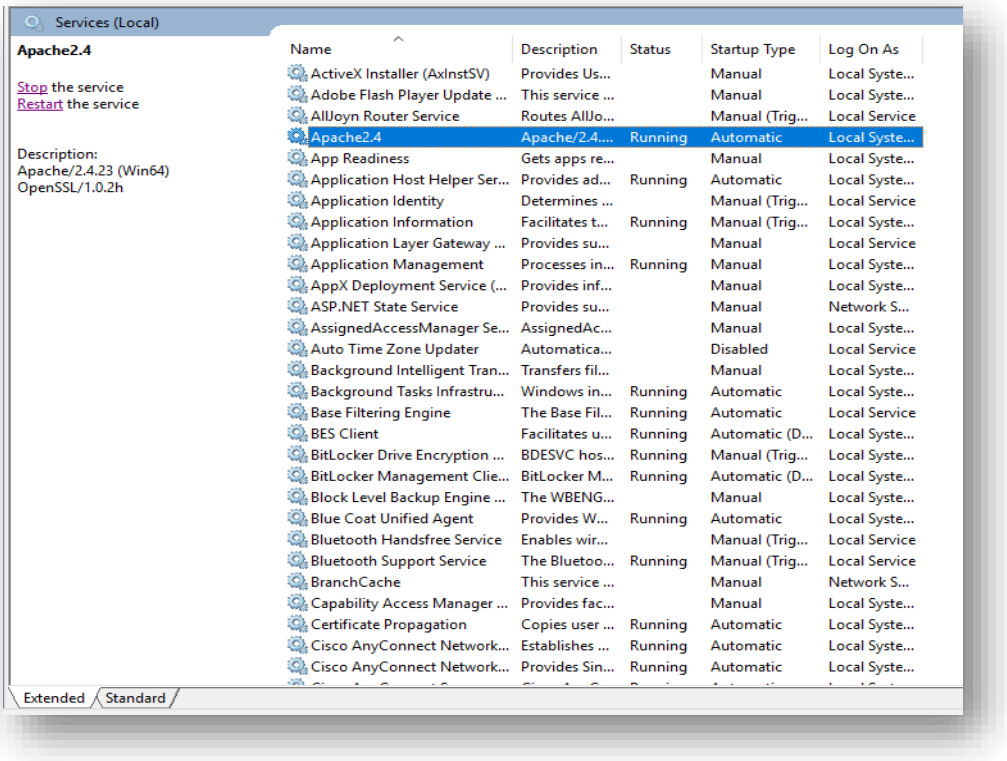


Figure 16 - Screenshot of the Apache service

# 2.8 Microsoft Visual C++ 2015 Redistributable Package

Table 9 - Microsoft Visual C++ 2015 Redistributable Package

| | |
|---|---|
| Version | 2015 |
| Purpose | It is required for installation of Python packages |
| Source | Available as part of BigFix Runbook AI installer package. Follow the below path:<br>Pre-Requisite Software → vc_redist.x64.exe |

## 2.8.1 Installation Procedure

1. Download the file **vc_redist.x64.exe** from the Path mentioned in source field of Table 9 - Microsoft Visual C++ 2015 Redistributable Package.
2. Install by double clicking on the file named **vc_redist.x64**. Accept the terms and conditions and click **Install** to complete the setup.

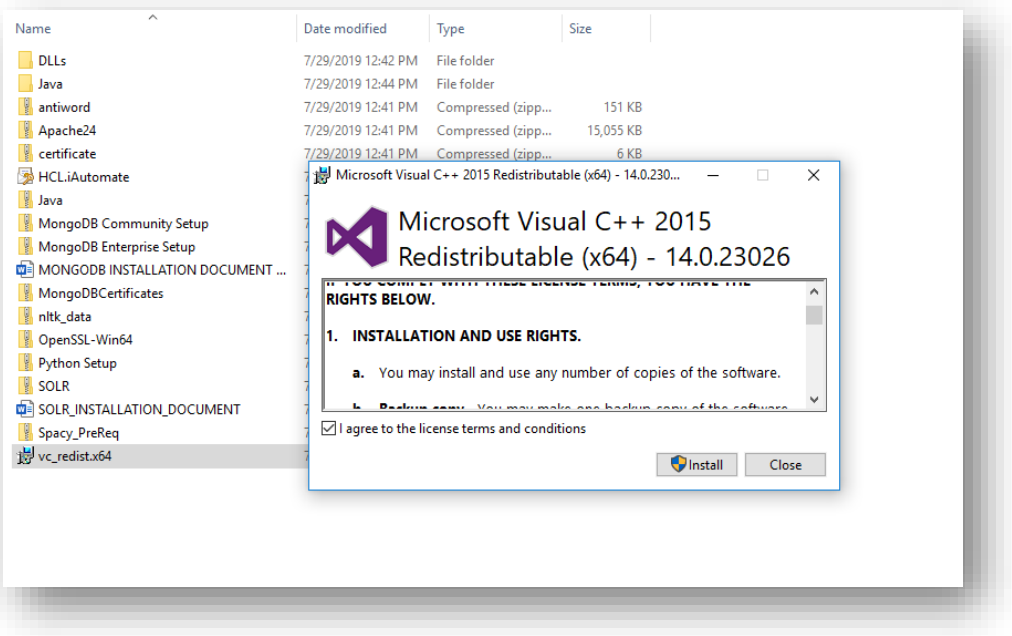


Figure 17 - Installation of Visual C++

## 2.9 AntiWord

Table 10 – AntiWord Requirements

| | |
|---|---|
| Version | NA |
| Purpose | It is used for document crawling |
| Source | Available as part of BigFix Runbook AI installer package. Follow the below path:<br><br>Pre-Requisite Software → antiword.zip |

## 2.9.1Installation Procedure

1. Download the file **antiword.zip** from the Path mentioned in the source field of Table 10 – AntiWord Requirements.
2. Extract the contents of zip file to the given path: ***C:\antiword***.
3. System environment variable **ANTIWORDHOME** needs to be set with path ***C:\antiword***.

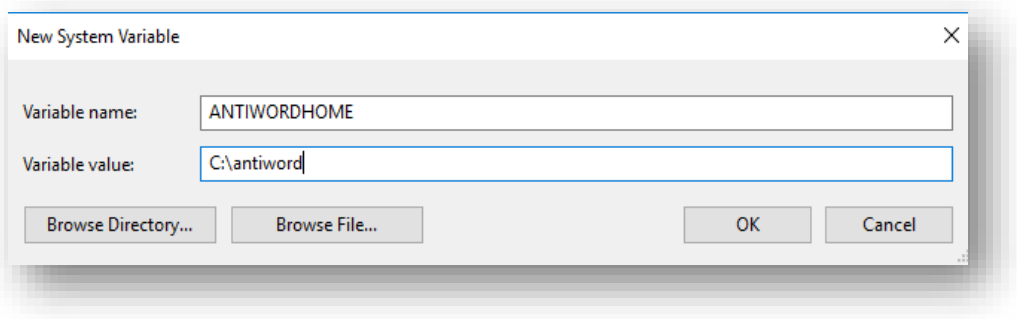


Figure 18 - Environment Variable Screen

## 2.10Spacy

Table 11 – Spacy Requirements

| | |
|---|---|
| Version | 3.1.2 |
| Purpose | Spacy package of python needs to be present before starting any of the services |
| Source | Available as part of BigFix Runbook AI installer package. Follow the below path:<br><br>Pre-Requisite Software → Spacy_PreReq.zip |

## 2.10.1Installation Procedure

1. Download the file **Spacy_PreReq.zip** from the Path mentioned in the source field of Table 11 – Spacy Requirements. The extracted contents from the zip file named as Spacy_PreReq should be placed in the path.

```
C:\Python38\Lib\site-packages
```

Please ensure to copy the files inside the folder **Spacy_PreReq** to path **C:\Python38\Lib\site-packages**.

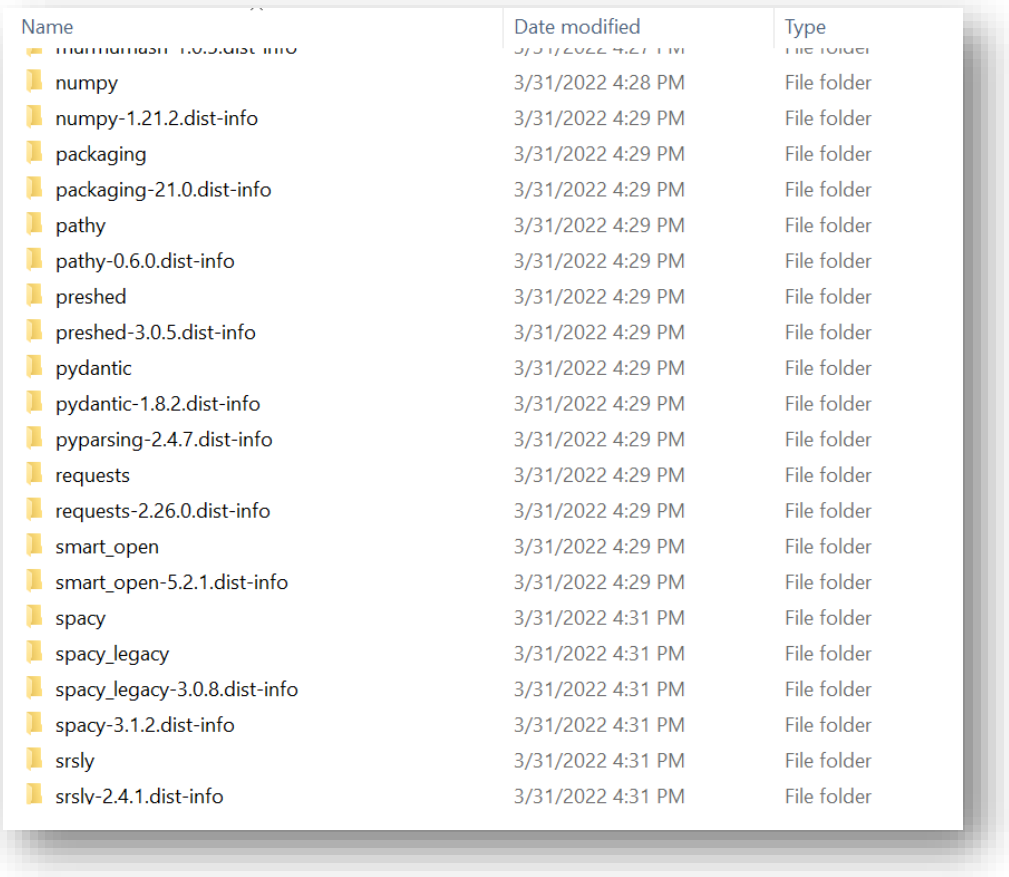


Figure 19 - Spacy Package Content

# 2.11NumPy

Table 12 – NumPy Requirements

| | |
|---|---|
| Version | 1.20.3 |
| Purpose | NumPy package of python needs to be present before starting any of the services |
| Source | Available as part of BigFix Runbook AI installer package. Follow the below path:<br><br>Pre-Requisite Software → numpy.zip |

## 2.11.1Installation Procedure

1. Before installing NumPy, the previous version of NumPy needs to be removed, if already installed.

   Open a new command prompt and execute the below command to uninstall the existing version.

```
pip uninstall numpy
```

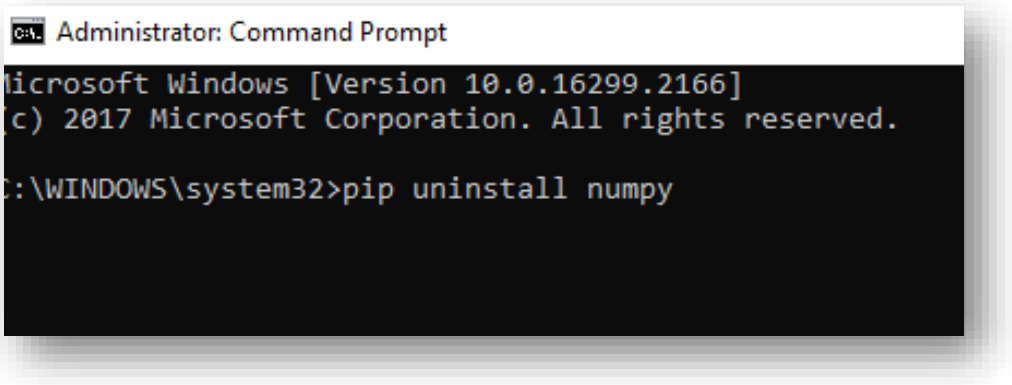


Figure 20 – Uninstalling existing NumPy Package

2. Download the file **numpy.zip** from the Path mentioned in the source field of Table 12 – NumPy Requirements. The extracted contents from the zip file consists of two folders as depicted in the figure below. Place these two folders in the python site-packages path.

```
C:\Python38\Lib\site-packages
```

Please ensure to copy the two folders inside NumPy folder to path C:\Python38\Lib\site-packages.

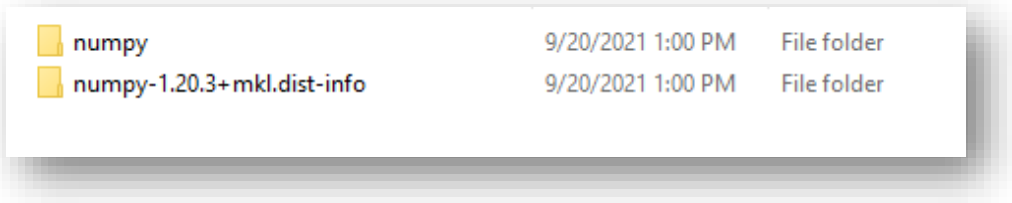


Figure 21 –NumPy zip folder contents

# 2.12Mod_wsgi

Table 12 – Mod_wsgi Requirements

| | |
|---|---|
| Version | 4.9.0 |
| Purpose | Mod_wsgi package of python needs to be present before starting any of the services |
| Source | Available as part of BigFix Runbook AI installer package. Follow the below path:<br><br>Pre-Requisite Software → mod_wsgi.zip |

## 2.12.1Installation Procedure

1. Download the file **mod_wsgi.zip** from the Path mentioned in the source field of Table 12 – NumPy Requirements. The extracted contents from the zip file consists of two folders as depicted in the figure below. Place these two folders in the python site-packages path.

```
C:\Python38\Lib\site-packages
```

Please ensure to copy the two folders inside NumPy folder to path C:\Python38\Lib\site-packages.

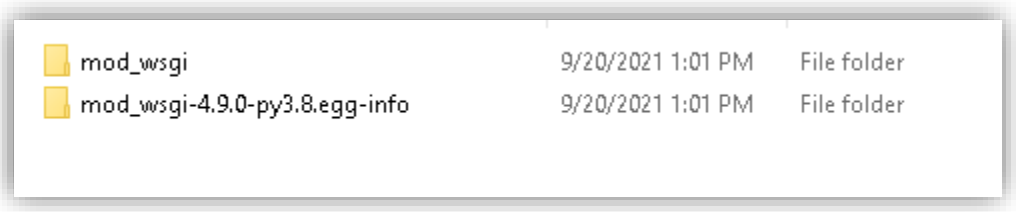


Figure 16 –mod_wsgi zip folder contents

# 2.13En_core_web_sm

Table 13 – En_core_web_sm Requirements

| | |
|---|---|
| Version | 3.1.0 |
| Purpose | En_core_web_sm package of python needs to be present before starting any of the services |
| Source | Available as part of BigFix Runbook AI installer package. Follow the below path:<br><br>Pre-Requisite Software → en_core_web_sm.zip |

## 2.13.1Installation Procedure

1. Download the file **en_core_web_sm.zip** from the Path mentioned in the source field of Table 12 – NumPy Requirements. The extracted contents from the zip file consists of two folders as depicted in the figure below. Place these two folders in the python site-packages path.

```
C:\Python38\Lib\site-packages
```

Please ensure to copy the two folders inside NumPy folder to path C:\Python38\Lib\site-packages.

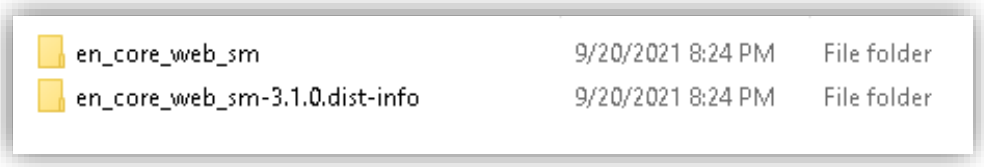


Figure 17 –en_core_web_sm zip folder contents

## 2.14Java

Table 13 – Java Details

| | |
|---|---|
| Version | Open Jdk distribution of Java version 1.8.0_282 |
| Purpose | Advanced AI component of BigFix Runbook AI requires Apache Solr for which Java is a prerequisite. |
| Source | Available as part of BigFix Runbook AI installer package. Follow the below path:<br><br>Pre-Requisite Software → java-1.8.0-openjdk.zip |
| Note | It needs to be installed on the server where Apache Solr will be installed |

### 2.14.1Installation Procedure

1. Download the folder **java-1.8.0-openjdk.zip** from the path mentioned in the source field of Table 13 – Java Details.
2. Create a folder with the name **'Java'** in the path ***C:\Program Files*** and extract zip file inside Java Folder. It should contain the extracted content only.
3. Please perform the following steps to set environment variable for Java:
   a. Open **File Explorer**, go to **This PC**, right-click and select **Properties**.

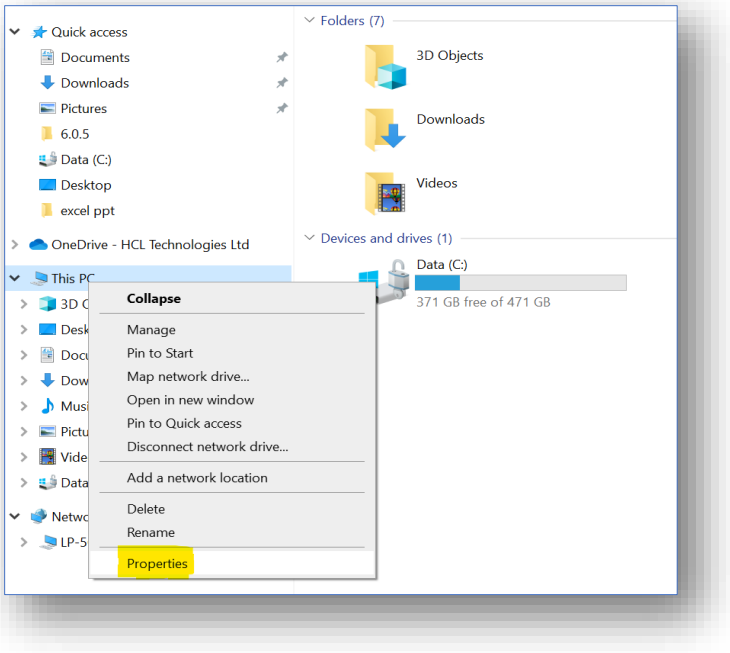


Figure 22 – File Explorer

b. Click on **Advanced** tab in **System Properties** window.

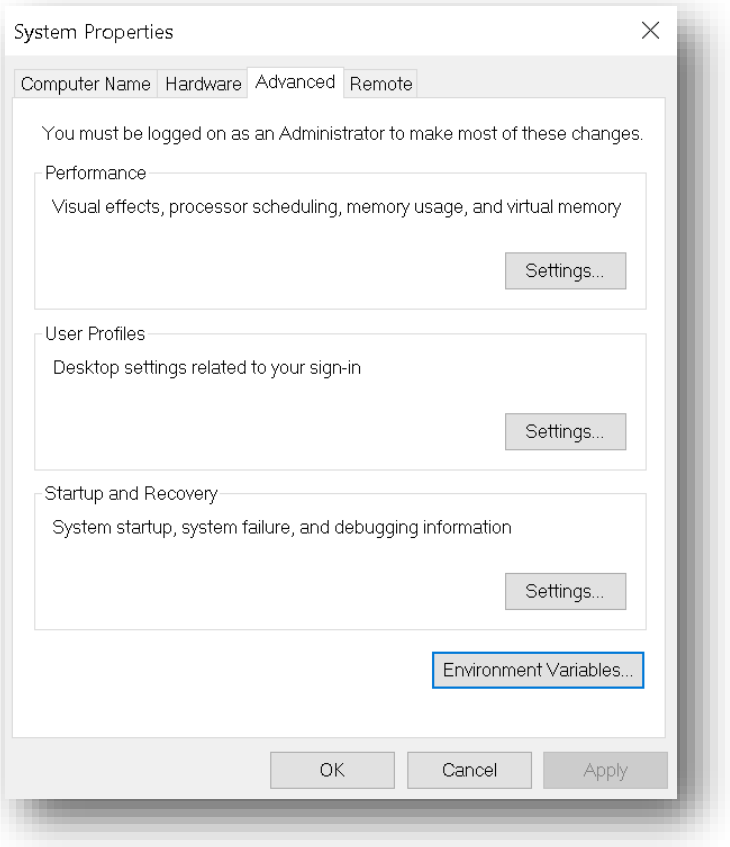


Figure 23 - Advanced System Settings

c. Click **Environment Variables**.

d. Click **New** under **System Variables** section.

e. Enter 'JAVA_HOME' in the **Variable name** section and 'C:\Program Files\Java' in **Variable value** section.

f. Click **OK** to close the box.

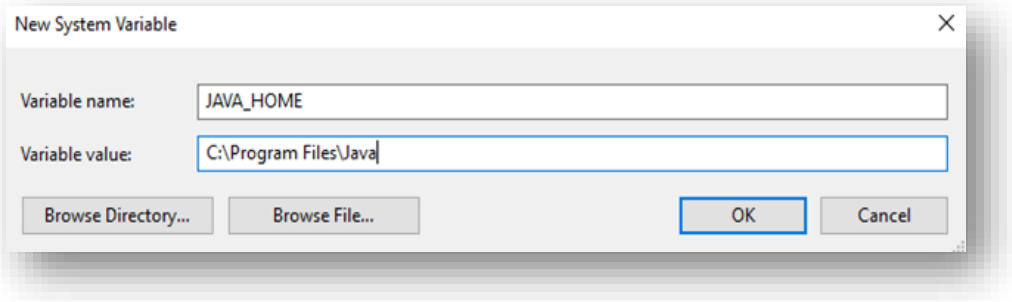


Figure 24 - Adding JAVA_HOME variable

g. Under **System variables** section, find the variable named **Path**, select that variable and click the **Edit** button.

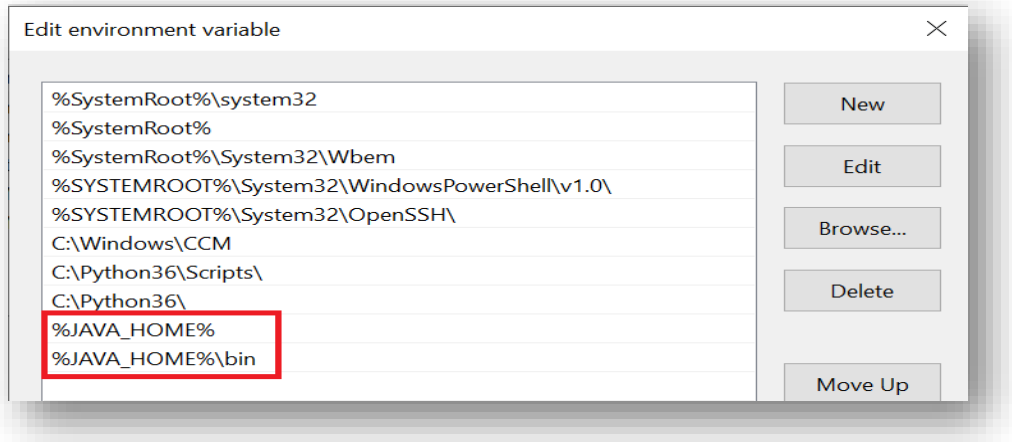


Figure 25 - Adding java to Path variable

h. If the last character of **Variable value** box is not a semi-colon (;) then add semi-colon at the end.

i. Add %JAVA_HOME%; at the end of the Variable value.

j. Further add **%JAVA_HOME%\bin;** at the end of the **Variable value**.

k. Click **OK** to close the dialog box.

4. To validate successful installation of Java, open **Command Prompt** as **Administrator,** and type **java –version** and press **Enter** on the keyboard**.**

On successful Java installation, **Java Version** will be displayed.

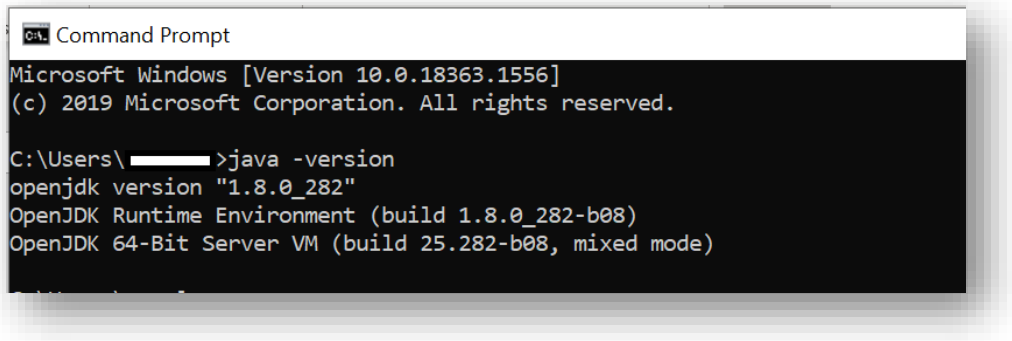


Figure 26 - Check Java Version

# 2.15MongoDB

Table 14 – MongoDB Requirements

| | |
|---|---|
| Version | 4.0 |
| Purpose | It is a NoSQL database and used for storing documents' content. |
| Source | This is available as part of BigFix Runbook AI installer package.<br>**For Community Version:** Follow the below path:<br>Pre-Requisite Software → mongodb-win32-x86_64-2008plus-ssl-4.0.25-signed.msi.<br>**For Enterprise Version:** Follow the below path:<br>Pre-Requisite Software → mongodb-win32-x86_64-enterprise-windows-64-4.0.25-signed.msi. |

MongoDB is an open-source NoSQL document database. MongoDB stores information in the form of documents. It is used in BigFix Runbook AI to store meta-data information of Knowledge articles, SOPs etc. and various NLP models used in iKnowledge module.

This document describes steps for installation and configuration of MongoDB version 4.0 for Community and Enterprise edition in High Availability (HA) and non-High Availability (non-HA) mode.

Before proceeding with the installation, a user should already have identified various configurational parameters mentioned below:

- **Encryption Required**: At Rest or In-Transit

- **High Availability**: Required / Not Required
- **Version**: Enterprise or Community

If encryption is required, proceed with MongoDB Enterprise version.

# 2.15.1MongoDB Installation Procedure without HA mode

## 2.15.1.1Community Version:

This section describes the procedure for installation of MongoDB with authentication and authorization configured for Community Edition.

Important note:

- Please ensure the ports that are to be used for MongoDB service is open for communication with the help of a windows administrator.
- During the installation procedure, whenever the MongoDB service is restarted, open the new command prompt to run further commands.

### 2.15.1.1.1Installation steps

1. Download the file **mongodb-win32-x86_64-2008plus-ssl-4.0.25-signed.mse** from the Path mentioned in the source field of Table 14 – MongoDB Requirements for Community Version.
2. Double-click on **mongodb-win32-x86_64-2008plus-ssl-4.0.25-signed.mse** file and select installation option as **Complete** and click **Next**.

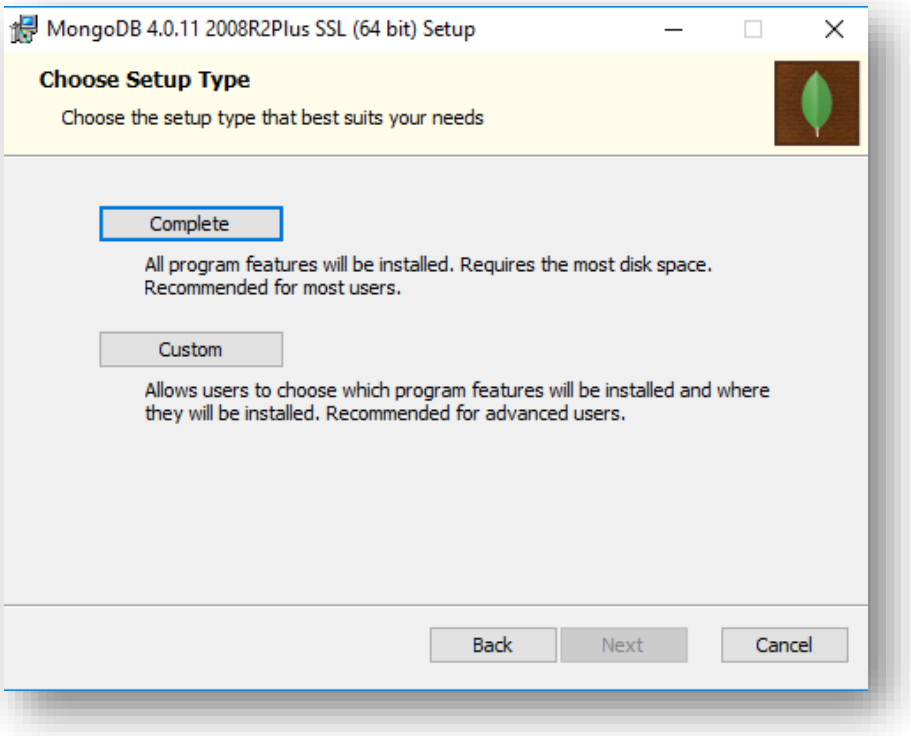


Figure 27 - MongoDB Installation - Community Version (non-HA)

3. The option **Install MongoDB as service** would be checked by default.

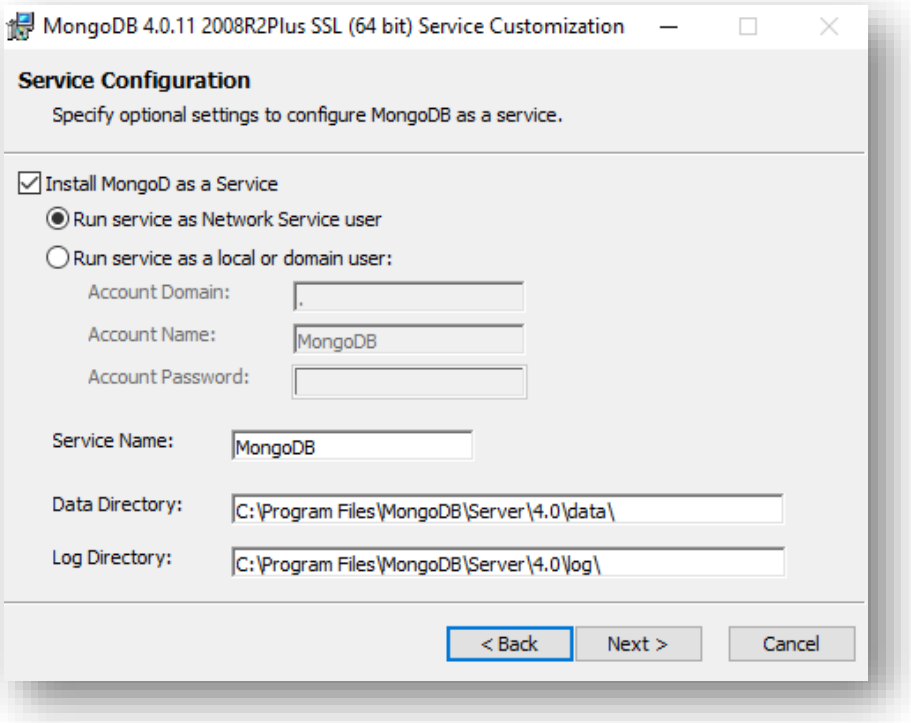


Figure 28 - MongoDB Installation - Community Version (non-HA) (Cont.)

4. Uncheck **Install MongoDB as Service** and click **Next**.

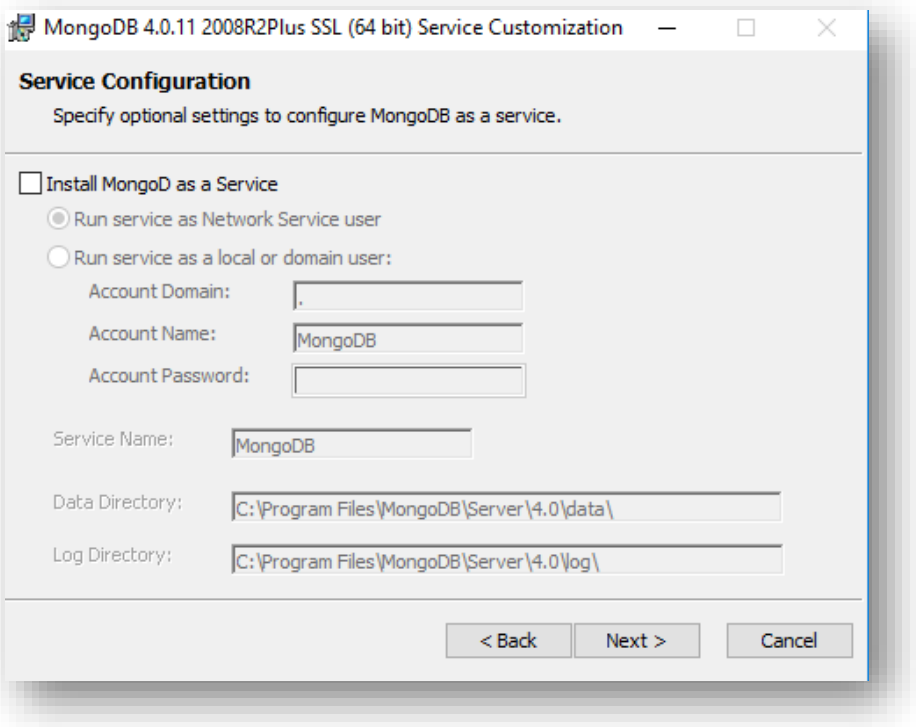


Figure 29 - MongoDB Installation - Community Version (non-HA) (Cont.)

5. Wait till the MongoDB installation is complete.

## 2.15.1.1.2Add MongoDB to the Path:

To add MongoDB to the PATH, please perform the below steps:

1. Go to the location where MongoDB was installed. For e.g., ***C:\Program Files\MongoDB***.
2. Inside MongoDB, go to ***folder\Server\4.0\bin***.
3. Go to **Control Panel → System and Security→System**.
4. Select Advanced System Settings and click Environment Variables.

   This will open a new dialog box.
5. Select the variable path in **System Variables** and add path of MongoDB. For e.g. - ***C:\Program Files\MongoDB\Server\4.0\bin***.

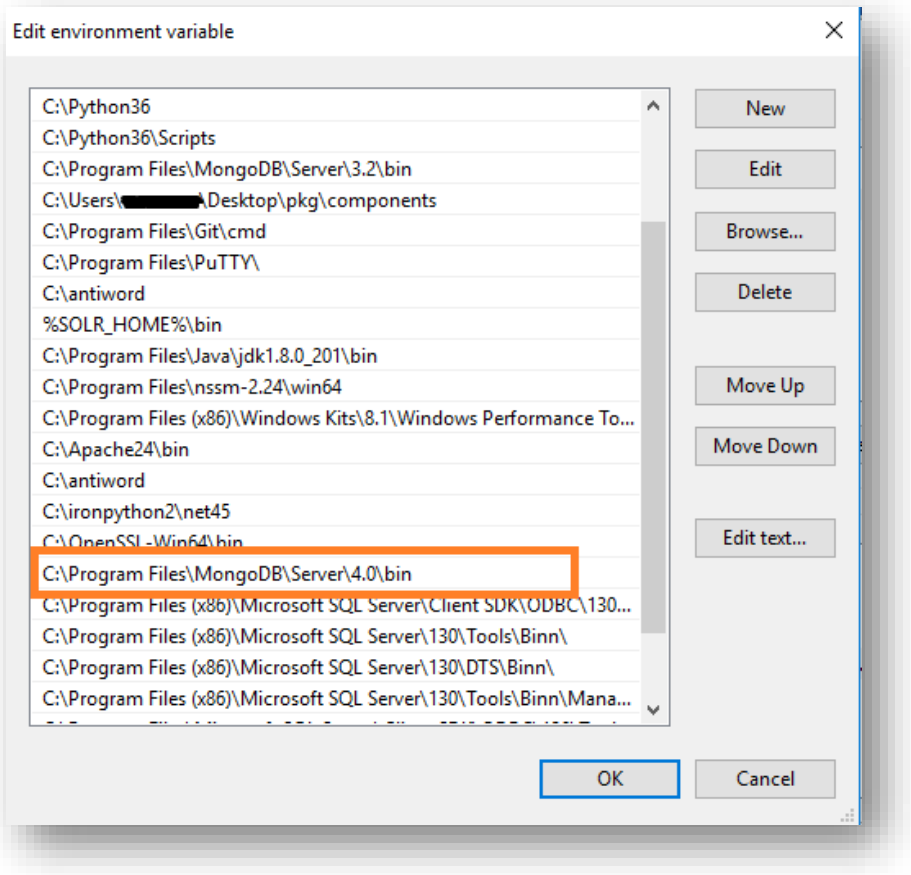


Figure 30 - MongoDB Installation - Community Version (non-HA) (Cont.)

## 2.15.1.1.3Creation of Directory Structure:

1. Create a folder named **mongo**. It should not be in the same location where MongoDB is installed.
2. Inside the folder **mongo**, create a folder named **data** and then create three folders named as **config**, **database** and **log** as shown in Figure 32**.**

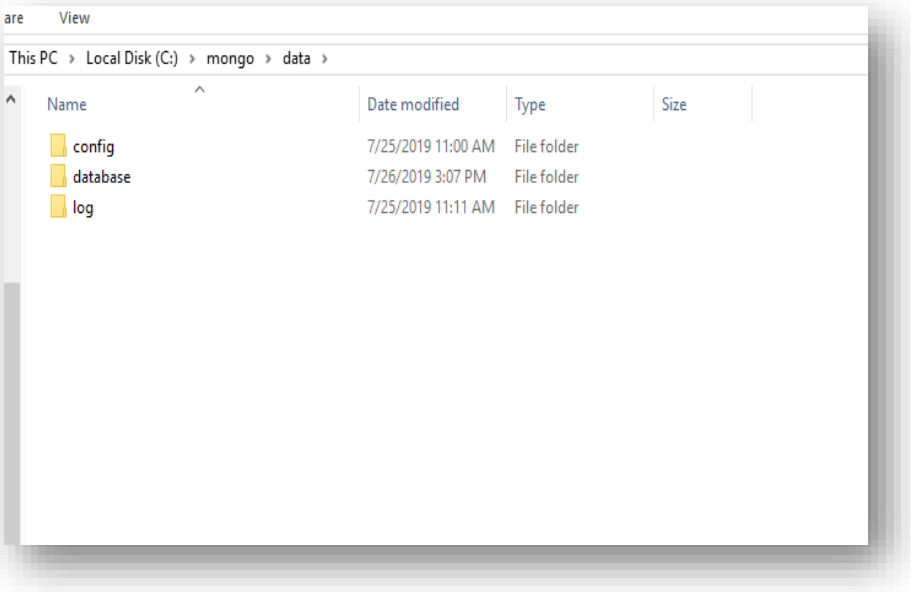


Figure 31 - MongoDB Installation - Community Version (non-HA) (Cont.)

## 2.15.1.1.4Creation of MongoDB Service

1. Go to the location where MongoDB is installed. Refer to the Path set in the PATH environment variable. For e.g., ***C:\Program Files\MongoDB***.
2. Go to bin folder. for e.g., *C:\Program Files\MongoDB\Server\4.0\bin*.
3. Locate the file named **mongod.cfg** and copy the file.

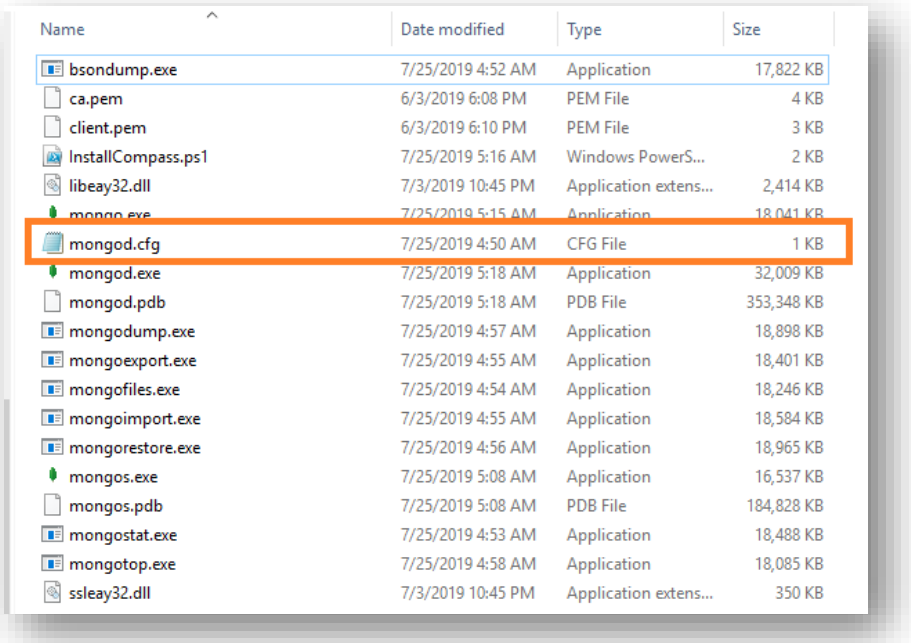

Figure 32 – Creation of MongoDB service

4. Go to the **mongo** folder that was custom created earlier. Inside the directory **data**, go to the **config** folder. Paste the mongod.cfg file here.

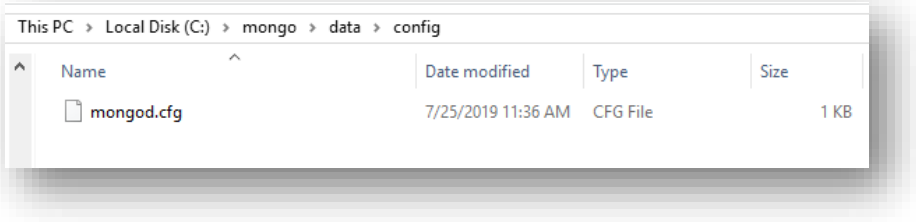


Figure 33 - Creation of MongoDB service (Cont.)

5. Open the file **mongod.cfg** (preferably in Notepad++ or Sublime) and follow the below steps:

While editing the file, maintaining indentation in the file is very important.

   a. In the **storage** header, change the following field:
      - **dbPath**: Add path till mongo\data\database.
   b. In the **systemLog**, change the following field:
      - **Path**: Add path of mongo\data\log\mongod.log.

Folder mongo\data\log doesn't have Mongod.log. This will be created automatically when mongoDB service is created.

   c. In the **net**, change the following fields:
      - **Port**: Enter the port for the installation of MongoDB.
      - **bindIpAll**: true.

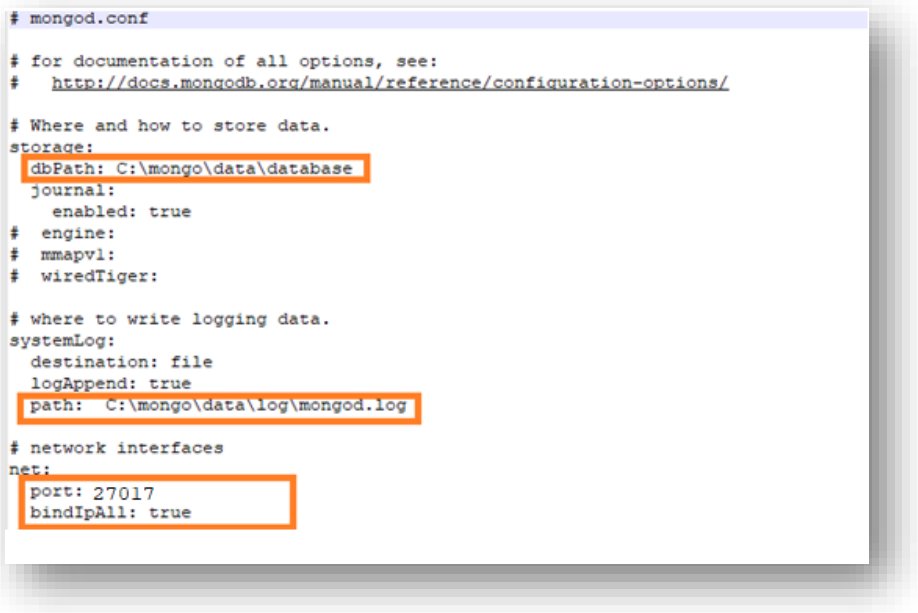


Figure 34 - Creation of MongoDB service (Cont.)

d. Save the changes made in the file mongod.cfg.

e. Open the **Command Prompt as Administrator** and run the following command:

Please make sure to provide correct path for config.

```
mongod –config "<path of the mongoDB folder you
created\mongo\data\config\mongod.cfg>" --install --serviceName
"MongoDB"
For e.g.  mongod --config "C:\mongo\data\config\mongod.cfg" --
install --serviceName "MongoDB"
```

f. MongoDB service with the name MongoDB will be created.

## 2.15.1.1.5Start MongoDB Service

1. Press **Windows+R**, and type **services.msc** and press **Enter**.

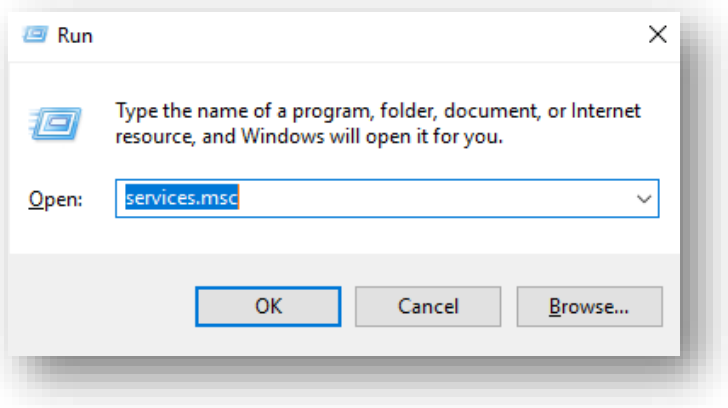


Figure 35 – Start MongoDB Service

2. Search for **MongoDB service**, then click on **MongoDB service** and click **Start the service** on the Left pane.

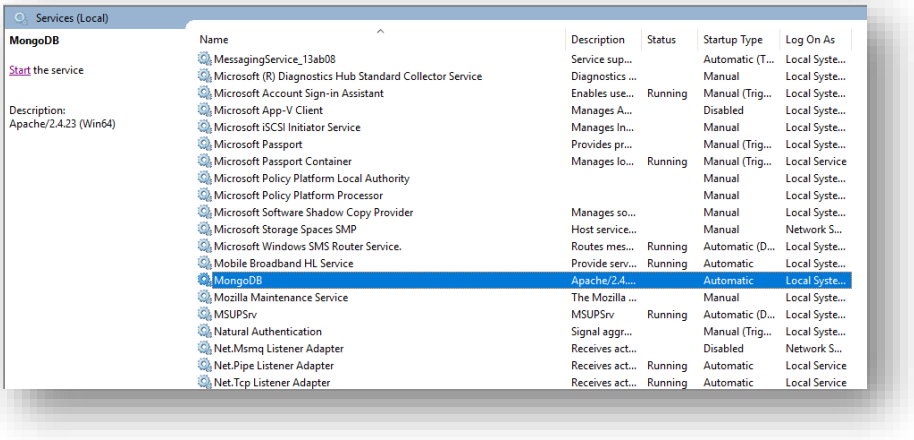


Figure 36 - Start MongoDB Service (Cont.)

3. Go to the server that has MongoDB service installed. Open the **Command Prompt** as **Administrator** and execute the below commands by changing the respective IP and port of server.

```
mongo --host <IP> --port <port on which mongoDB service is
running(mentioned in config file)>

for e.g. - mongo --host 10.1.1xx.x1 --port 27017
```

4. If the service is running successfully, the connection will be established without any error message.

## 2.15.1.1.6Enable Authentication

To enable the authentication, perform the following steps:

1. Go to the server where MongoDB service has been installed. Open the **Command Prompt** as **Administrator** and execute the below command.

```
mongo --host x.x.xx.x1 --port 27017
```

2. Execute the below command.

```
MongoDB> use admin
```

3. Make the following changes in the values before execution:
   - user:<user-name >
   - pwd :<password>

(choose any password for the corresponding user for MongoDB authentication.)

```
MongoDB>> db.createUser(
  {
    user: "admin",
    pwd: "comnet123",
    roles: [ { role: "userAdminAnyDatabase", db: "admin" }, {
role: "root", db: "admin" }, "readWriteAnyDatabase" ]
  }
)
```

4. Make the following changes in mongod.cfg. Refer the screenshot below:

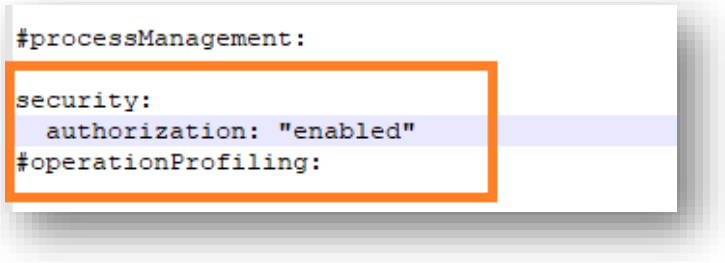


Figure 37 – Enable Authentication

5. Restart the **MongoDB service** in the server.
6. Re-open the **Command Prompt as Administrator** and open the MongoDB terminal using the following command:

```
mongo --host <IP> --port <Port> -u <username> -p <password> --
authenticationDatabase "admin"
For e.g. - mongo --host x.x.xx.x --port 27017 -u admin -p
comnet123 --authenticationDatabase "admin"
```

7. Connection with MongoDB should be successfully established.

## 2.15.1.1.7Test the Connection

To test the connection, perform the following steps:

Python 3.6 should be present. You should also have the BigFix Runbook AI installer package as it contains some resources to be used in subsequent steps.

1. Open the **Command Prompt as Administrator** and execute the following command to install pymongo:

```
pip install pymongo
```

   a. Copy the file named “mongo_connection_community_Non-HA.py” present in the installer package under iAutomateInstaller → Resources → Resources.zip folder to any folder.

   b. Open the file in Notepad and change the value of **Server IP** and **Port** where MongoDB service is running.

```
import ssl

from pymongo import MongoClient


client = MongoClient('<IP of the server>:<Port>',
                                    username='<Username>',
                                       password='<Password>',
                                       ssl=False)

db = client['DRYiCE_db']
db_collection = db['DRYiCE_Collection']

db_collection.insert({"name":"xyz"})
print("Connection to Mongo Database successful")
```

   c. Open the **Command Prompt as Administrator** mode. Change the current working directory to the folder that has code using the following command:

```
cd <folder path>
```

   d. Execute the code by using the following command.

```
python <file_name.py>
```

   e. If file executes without any error, then connection is successful.

## 2.15.1.2Enterprise Version

This section describes the procedure for installation of MongoDB with authentication and authorization configured for Enterprise Edition.

- Please ensure the ports that are to be used for MongoDB service is open for communication with the help of windows administrator.
- During the installation procedure whenever the MongoDB service is restarted, open the new command prompt window to run the further commands.

### 2.15.1.2.1Installation steps:

1. Download the file **mongodb-win32-x86_64-enterprise-windows-64-4.0.25-signed.mse** from the Path mentioned in the source field of Table 14 – MongoDB Requirements for Enterprise Version.
2. Double-click on **mongodb-win32-x86_64-enterprise-windows-64-4.0.25-signed.mse** file and select installation option as **Complete** and click **Next**.

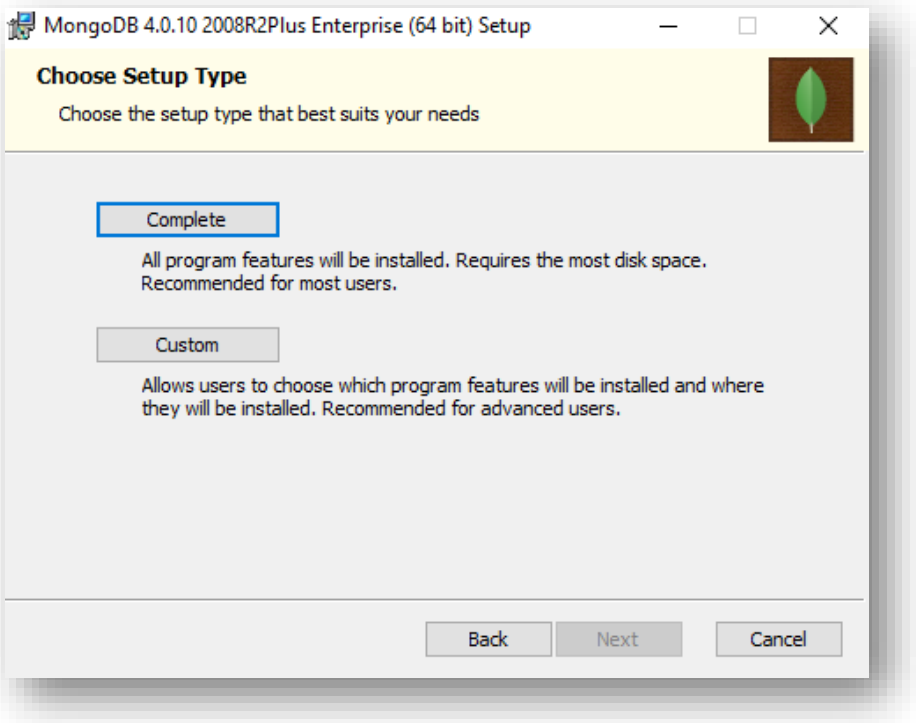


Figure 38 - MongoDB Installation - Enterprise Version (non-HA) (Cont.)

Please ensure to note the location of the installation directory of MongoDB.

3. The option **Install MongoDB as service** would be checked by default.

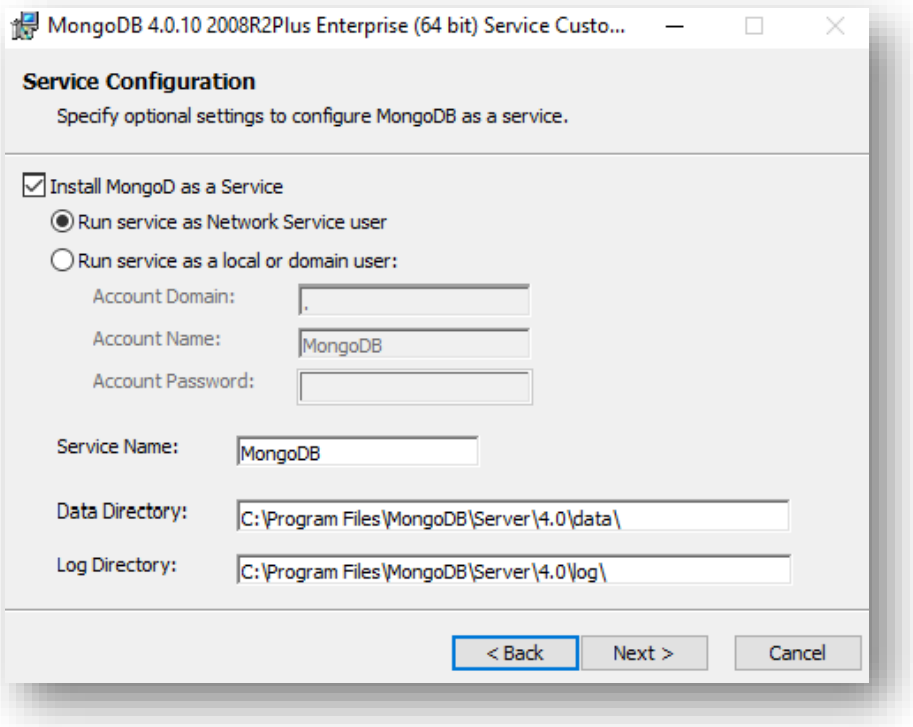


Figure 39 - MongoDB Installation - Enterprise Version (non-HA) (Cont.)

4. Uncheck **Install MongoDB as service** and click **Next**.

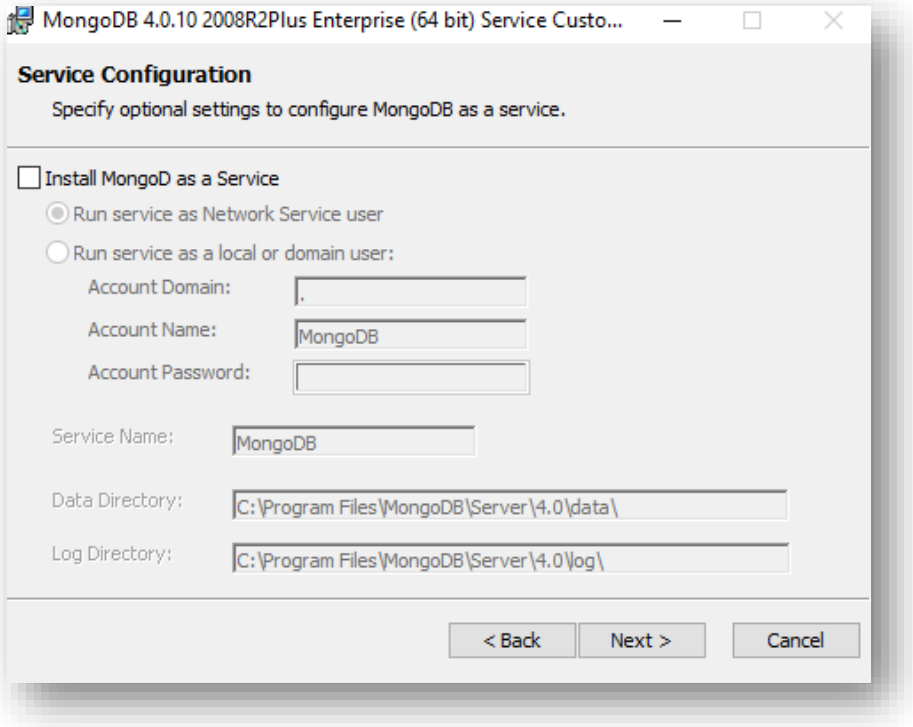


Figure 40 - MongoDB Installation - Enterprise Version (non-HA) (Cont.)

5. Wait till the MongoDB installation is complete.

## 2.15.1.2.2Add MongoDB to the Path

To add MongoDB to the PATH, please perform the below steps:

1. Go to the location where MongoDB was installed. For e.g., ***C:\Program Files\MongoDB***.
2. Inside MongoDB, go to ***folder\Server\4.0\bin***.
3. Go to **Control Panel→System and Security→Security**.
4. Select **Advanced System Settings**, click **Environment Variables**. This will open up a new dialog box.
5. Select the **Variable Path** in **System Variables** and add path of MongoDB. For e.g. - ***C:\Program Files\MongoDB\Server\4.0\bin***.

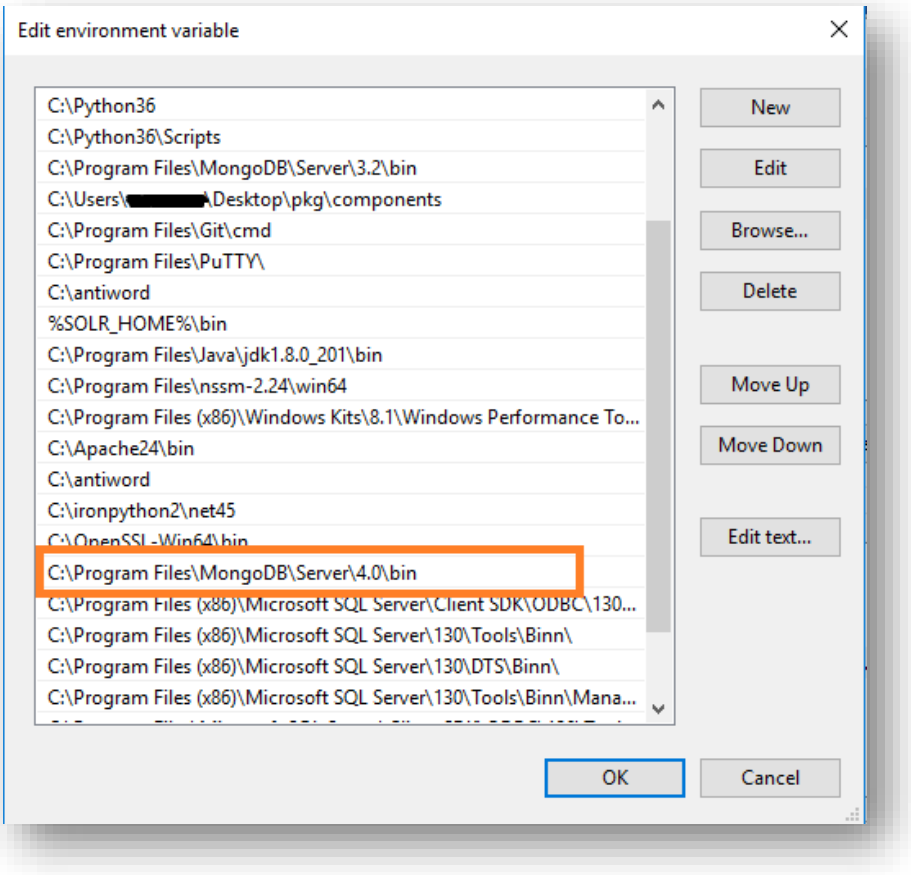


Figure 41 - MongoDB Installation - Enterprise Version (non-HA) (Cont.)

## 2.15.1.2.3Creation of Directory Structure

1. Create a folder named **mongo**. It should not be in the same location where MongoDB is installed.
2. Inside the folder **mongo**, create a folder named **data**.

3. Inside the folder **data**, create three folders named as **config**, **database**, and **log**.

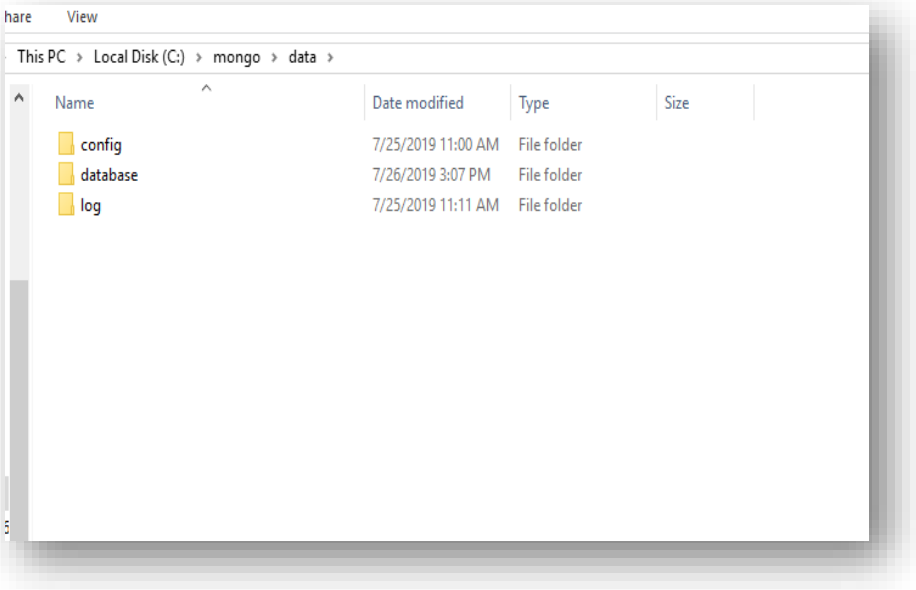


Figure 42 - MongoDB Installation - Enterprise Version (non-HA)

## 2.15.1.2.4Creation of MongoDB Service

1. Go to the location where MongoDB is installed. Refer to the Path set in the PATH environment variable. For e.g., ***C:\Program Files\MongoDB***.
2. Go to bin folder. for e.g., ***C:\Program Files\MongoDB\Server\4.0\bin***.
3. Locate the file named **mongod.cfg** and copy the file.

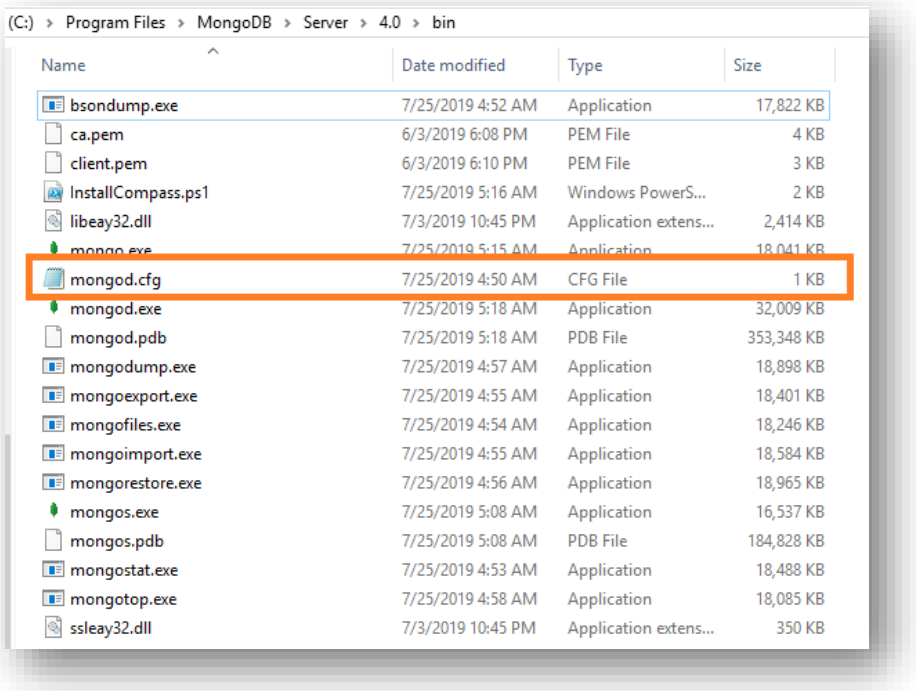


Figure 43 - MongoDB Installation - Enterprise Version (non-HA) (Cont.)

4. Go to the **mongo** folder that was created earlier. Inside the directory data, go to the **config** folder and paste the mongod.cfg file here.

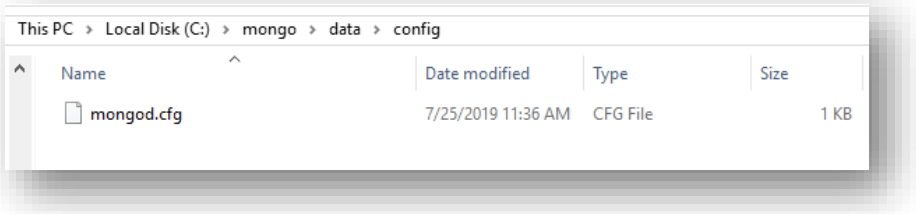


Figure 44 - MongoDB Installation - Enterprise Version (non-HA) (Cont.)

5. Open the file mongod.cfg (preferably in Notepad++ or Sublime) and follow the below steps:

While editing the file, maintaining indentation in the file is very important.

   a. In the **storage header**, change the following fields:
      - **DBPATH**: Add path till mongo\data\database
   b. In the **systemLog**, change the following fields:
      - **PATH**: Add path of mongo\data\log\mongod.log

Folder mongo\data\log doesn't have Mongod.log. This will be created automatically when mongo service is created.

   c. In the **net**, change the following fields:

- **port**: Enter the port you want to install MongoDB
- **bindIpAll**: true

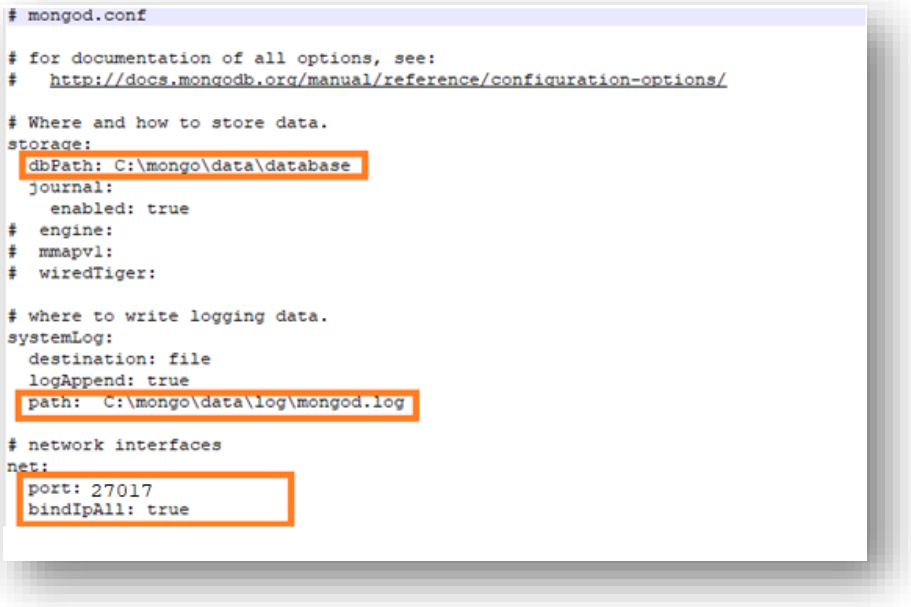


Figure 45 - MongoDB Installation - Enterprise Version (non-HA) (Cont.)

6. Save the changes made in the file mongod.cfg.
7. Open the Command Prompt as Administrator and run the following command.

Please ensure to enter correct path of config).

```
mongod –config "<path of the mongoDB folder you
created\mongo\data\config\mongod.cfg>" --install --serviceName
"MongoDB"

For e.g.  mongod --config "C:\mongo\data\config\mongod.cfg" --
install --serviceName "MongoDB"
```

8. MongoDB service with the name MongoDB will be created.

## 2.15.1.2.5Start MongoDB Service

1. Press **Windows+R**, type **services.msc** and press **Enter**.

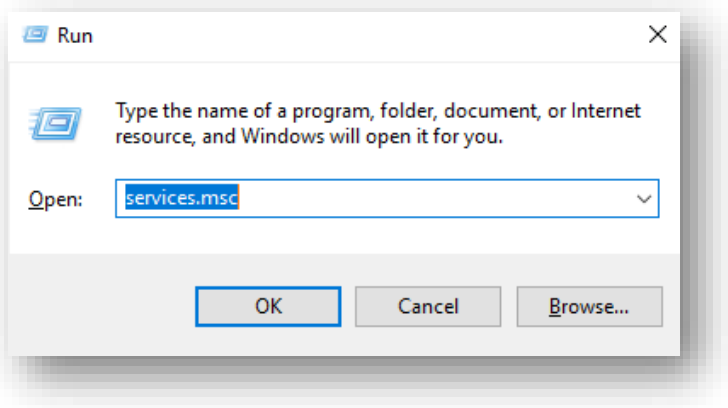


Figure 46 - MongoDB Installation – Start MongoDB Service (non-HA)

2. Search for **MongoDB service**.
3. Click **MongoDB service** and click **Start the service** on the Left pane.

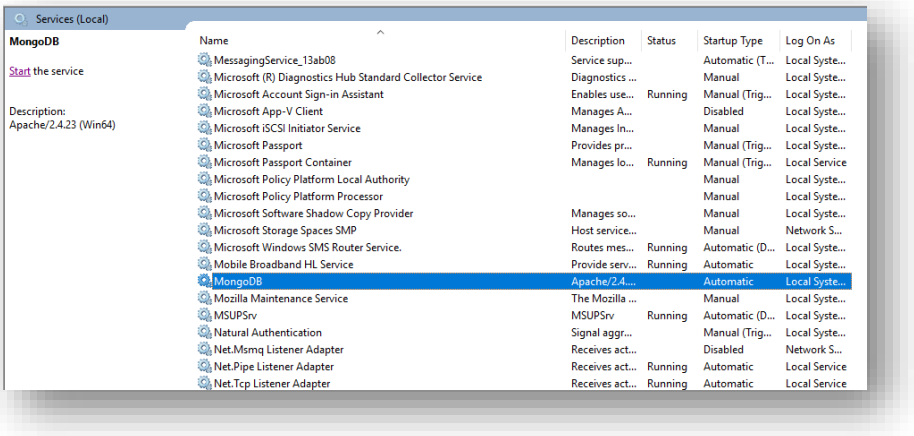


Figure 47 - MongoDB Installation – Start MongoDB Service (non-HA) (Cont.)

4. Go to the server that has MongoDB service installed.
5. Open the **Command Prompt** as **Administrator** and execute the below command by changing respective IP and port of server.

```
mongo --host <IP> --port <port on which mongoDB service is
running(mentioned in config file)>

for e.g. - mongo --host 10.1.1xx.x1 --port 27017
```

6. If the service is running successfully, then connection will be established. If not, then follow the above steps again.

## 2.15.1.2.6Enable Authentication

To enable the authentication, perform the following steps:

1. Go to the server where MongoDB service has been installed.
2. Open the **Command Prompt as Administrator** and execute the below command:

```
mongo --host x.x.xx.x1 --port 27017
```

3. Execute the below command:

```
MongoDB Enterprise> use admin
```

4. Make the following changes in the values before execution:
   - **user**:<user-name >
   - **pwd** :<password>

(choose any password for the corresponding user for MongoDB authentication.)

```
MongoDB Enterprise> db.createUser(
  {
user: "admin",
pwd: "comnet123",
roles: [ { role: "userAdminAnyDatabase", db: "admin" }, { role:
"root", db: "admin" }, "readWriteAnyDatabase" ]
}
)
```

5. Make the following changes in mongod.cfg and refer to the screenshot below.

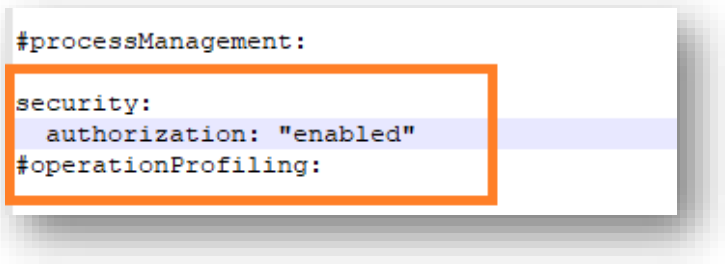


Figure 48 - MongoDB Installation – Start MongoDB Service (non-HA) (Cont.)

6. Restart the **MongoDB service** in the server.
7. Re-open the **Command Prompt** as **Administrator** and open the MongoDB terminal using the following command:

```
mongo --host <IP> --port <Port> -u <username> -p <password> --
authenticationDatabase "admin"
```

```
For e.g. - mongo --host x.x.xx.x --port 27017 -u admin -p
comnet123 --authenticationDatabase "admin"
```

8. Connection with MongoDB should be successfully established.

## 2.15.1.2.7Enable SSL Authentication

To enable SSL authentication, perform the following steps:

Please ensure that only one **ca.pem** should be generated. From the same **ca.pem, server.pem** for each server should be generated. From the same **ca.pem, client.pem** should be generated**.**

1. Generate the ca.pem, server.pem and client.pem by referring to the Generate ca.pem and server.pem and Generate client.pem.
2. After the ca.pem, client.pem and server.pem are generated, copy these files and paste them in the following path:

```
<MongoDB_installed_path>/MongoDB/Server/4.0/bin
For e.g. - C:\Program Files\MongoDB\Server\4.0\bin
```

3. Go to folder **mongo/data/config,** open the file **mongod.cfg** and make the following changes:

Please preserve the space and indentations as shown below. Ensure that editing is done in notepad++.

a. In the **net** header, enter the following values:

```
ssl:
      mode: allowSSL
      PEMKeyFile: C:\Program
Files\MongoDB\Server\4.0\bin\server.pem
      CAFile: C:\Program Files\MongoDB\Server\4.0\bin\ca.pem
```

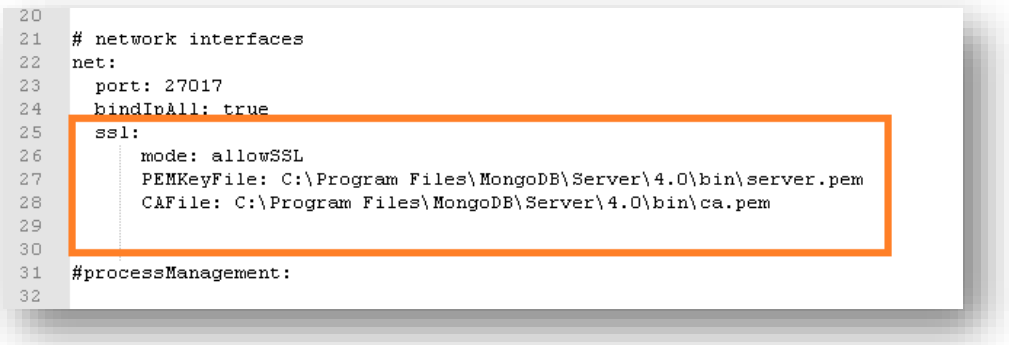


Figure 49 - MongoDB Installation – Enable SSL Authentication (non-HA)

b. Save the file for changes to be reflected.

4. Open the **Command Prompt** as **Administrator** on the server and execute the below command:

```
mongo --ssl --host <IP> --port <port> -u <username> -p <password>
--authenticationDatabase "admin" --sslCAFile "<path of ca.pem>" --
sslPEMKeyFile "<path of client.pem>"
for e.g. –
mongo --ssl --host x.x.x.x1 --port 27017 -u admin -p comnet123 --
authenticationDatabase "admin" --sslCAFile "C:\Program
Files\MongoDB\Server\4.0\bin\ca.pem" --sslPEMKeyFile "C:\Program
Files\MongoDB\Server\4.0\bin\client.pem"
```

5. This will establish the connection with MongoDB.
6. Execute the below commands:

```
MongoDB Enterprise>db.adminCommand( { setParameter: 1, sslMode:
"preferSSL" } )

MongoDB Enterprise> db.adminCommand( { setParameter: 1, sslMode:
"requireSSL" } )
```

7. Restart the **MongoDB** service on the server.

## 2.15.1.2.8Test the Connection

To test the connection, perform the following steps:

Python 3.6 should be present. You should also have the BigFix Runbook AI installer package as it contains some resources to be used in subsequent steps.

1. Open the **Command Prompt** as **Administrator** and execute the following command:

```
pip install pymongo
```

2. Copy the file named "**mongo_connection_enterprise_Non-HA.py**", present in the installer package under iAutomateInstaller → Resources →Resources.zip folder to any folder.
3. Open the file in Notepad and change the value of **IP**, **port**, **username**, **password**, **path of pem files** where **MongoDB** service is running**.**

```
import ssl

from pymongo import MongoClient


client = MongoClient('<IP of the server>:<Port>',
                                username='<Username>',
                                   password='<Password>',
```

```
                                        ssl=True,
                                        ssl_certfile="<path of
client.pem file>",
                                        ssl_ca_certs="<path of ca.pem
file>",
                    ssl_cert_reqs=ssl.CERT_REQUIRED)

db = client['DRYiCE_db']
db_collection = db['DRYiCE_Collection']

db_collection.insert({"name":"xyz"})
print("Connection to Mongo Database successful")
```

4. Open the **Command Prompt** as **Administrator**. Change the current working directory to the folder that has code using the following command:

```
cd <folder path>
```

5. Execute the code by using the following command:

```
python <file_name.py>
```

6. If the file executes without any error, the connection is successful.

## 2.15.2MongoDB Installation Procedure – with HA mode

High Availability in MongoDB is enabled using concept of replica set where at least three MongoDB instances are used to configure clusters. For BigFix Runbook AI, we will have three MongoDB instances where one instance will be Primary and rest of them will be Secondary. HA in MongoDB works as per below guidelines.

1. If primary node is down, then one of secondary node will be promoted to become primary node.
2. If secondary is down, then system will work as it is.

Replication amongst nodes is handled by MongoDB itself.

Replication provides redundancy and increases data availability. With multiple copies of data on different database servers, replication provides a level of fault tolerance against the loss of a single database server.

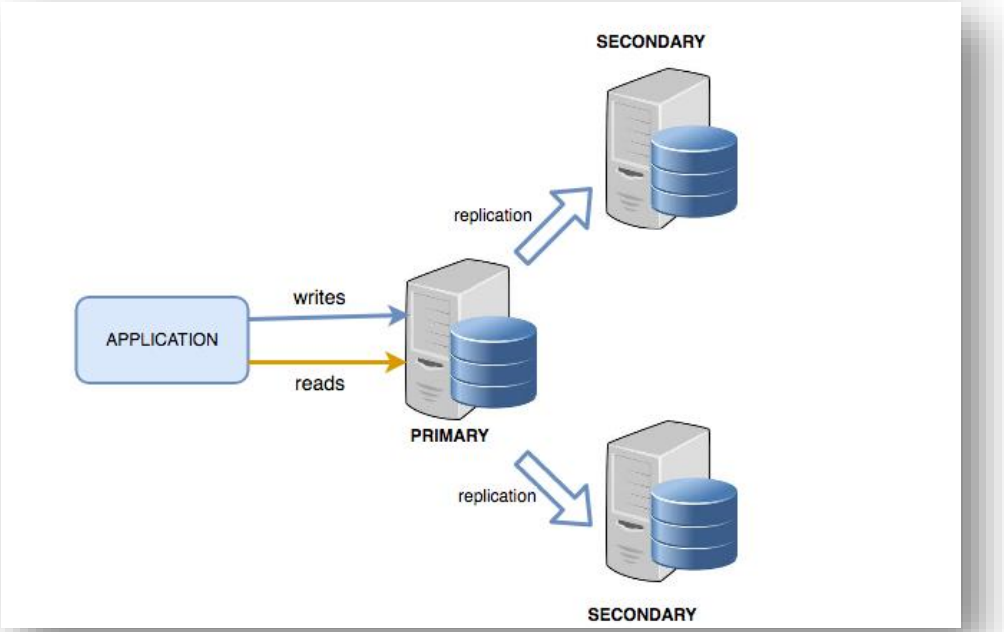


Figure 50 - Representation of MongoDB Replication set

For MongoDB in HA, at least three servers are required. If more than three servers are to be configured, ensure that they are odd in number. Please make sure the ports that are going to be used for MongoDB are open for communication.

## 2.15.2.1Community Version:

This section describes the procedure for installation of MongoDB with authentication and authorization configured for Community Edition in HA mode.

Important note:

- Please ensure the ports that are to be used for MongoDB service is open for communication with the help of Windows administrator.
- During the installation procedure whenever the MongoDB service is restarted, open the new command prompt to run the further commands.

### 2.15.2.1.1Installation steps:

1. Download the file **mongodb-win32-x86_64-2008plus-ssl-4.0.25-signed.mse** from the Path mentioned in the source field of Table 14 – MongoDB Requirements for Community Version.
2. Double-click on **mongodb-win32-x86_64-2008plus-ssl-4.0.25-signed.mse** file, then select installation option as **Complete** and click **Next**.

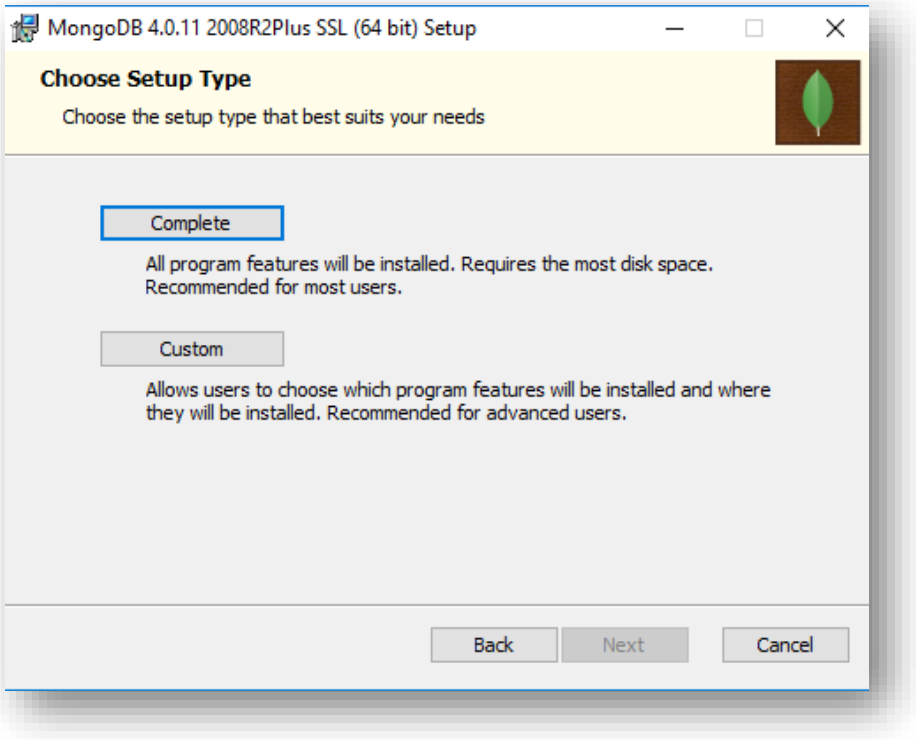


Figure 51 - MongoDB Installation - Community Version (HA)

3. The option **Install MongoDB as service** would be checked by default.

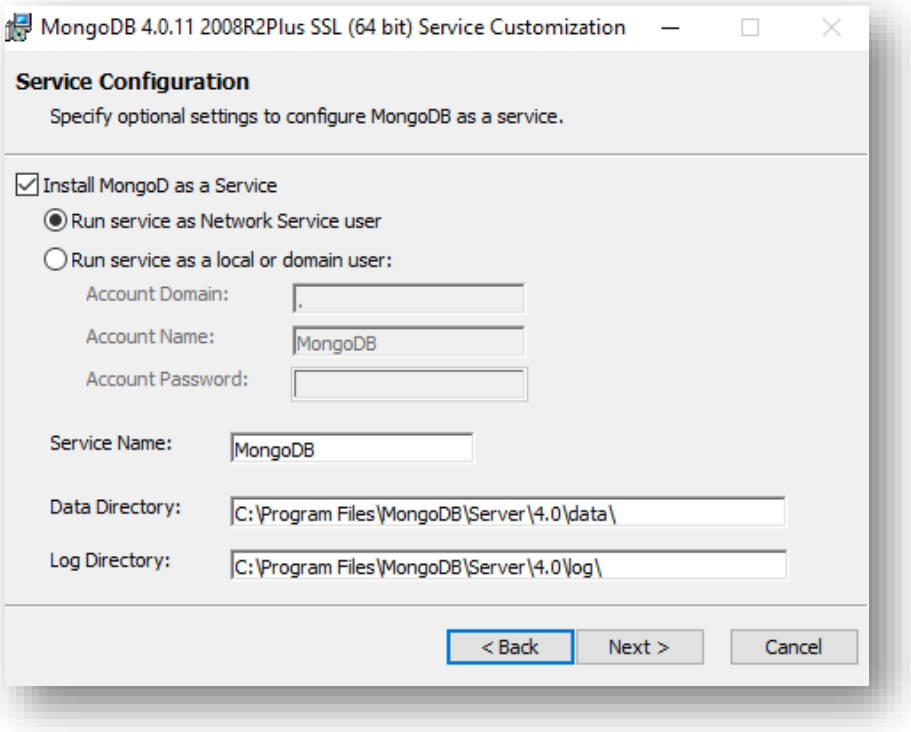


Figure 52 - MongoDB Installation - Community Version (HA) (cont.)

4. Uncheck **Install MongoDB as service** and click **Next**.

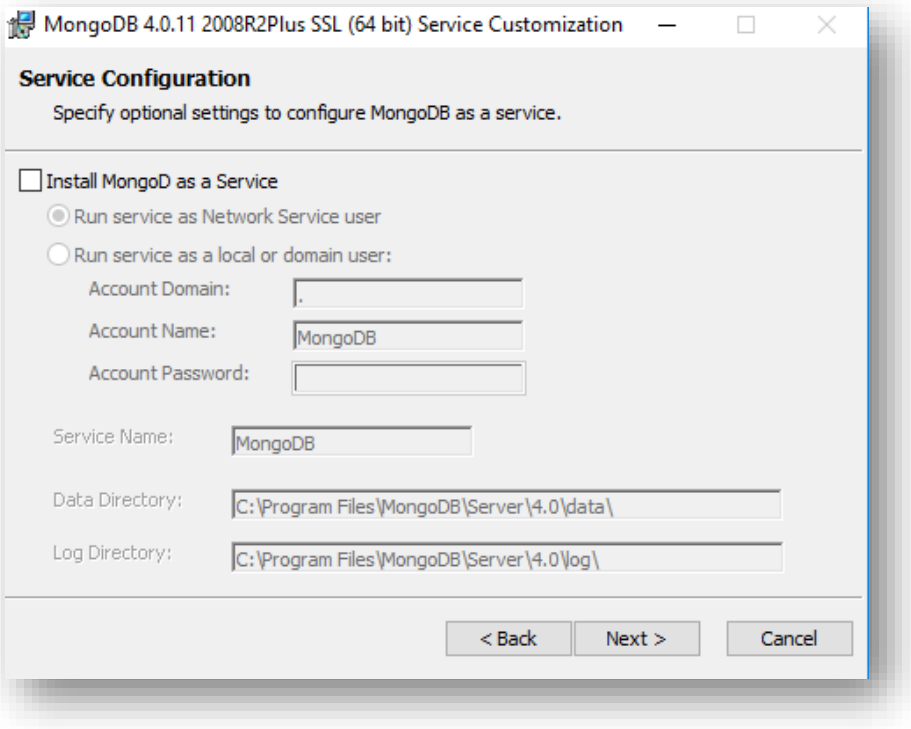


Figure 53 - MongoDB Installation - Community Version (HA) (cont.)

5. Wait till the MongoDB installation is complete.

## 2.15.2.1.2Add MongoDB to the Path:

To add MongoDB to the PATH, please perform the below steps:

1. Go to location where MongoDB was installed. For e.g., ***C:\Program Files\MongoDB***.
2. Inside MongoDB, go to ***folder\Server\4.0\bin***.
3. Go to **Control Panel → System and Security →Security**.
4. Select **Advanced System Settings** and click **Environment Variables**. This will open up a new dialog box.
5. Select the variable Path in **System Variables** and add path of MongoDB. For e.g. - ***C:\Program Files\MongoDB\Server\4.0\bin***.

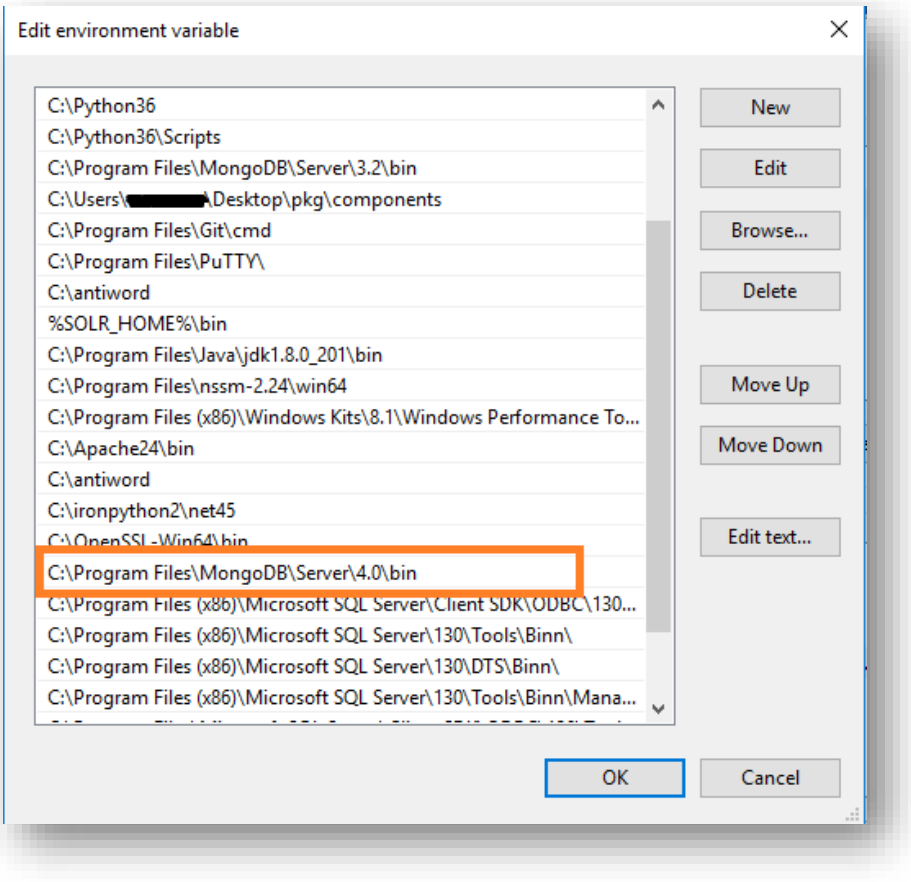


Figure 54 - MongoDB Installation - Community Version (HA) (cont.)

## 2.15.2.1.3Creation of Directory Structure:

1. Create a folder named **mongo**. It should not be in the same location where MongoDB is installed.

2. Inside the folder **mongo**, create a folder named **data**.
3. Inside the folder **data**, create three folders named as **config**, **database**, and **log**.

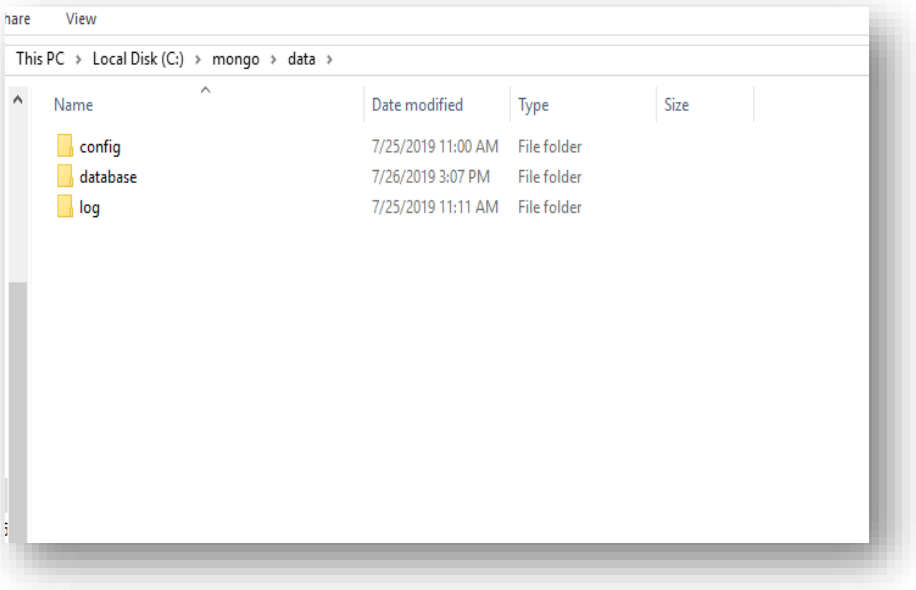


Figure 55 - MongoDB Installation - Community Version (HA) (cont.)

## 2.15.2.1.4Creation of MongoDB Service

1. Go to the location where MongoDB is installed. Refer to the **Path set** in the PATH environment variable. For e.g., ***C:\Program Files\MongoDB***.
2. Go to bin folder. for e.g., ***C:\Program Files\MongoDB\Server\4.0\bin***.
3. Locate the file named mongod.cfg and copy the file.

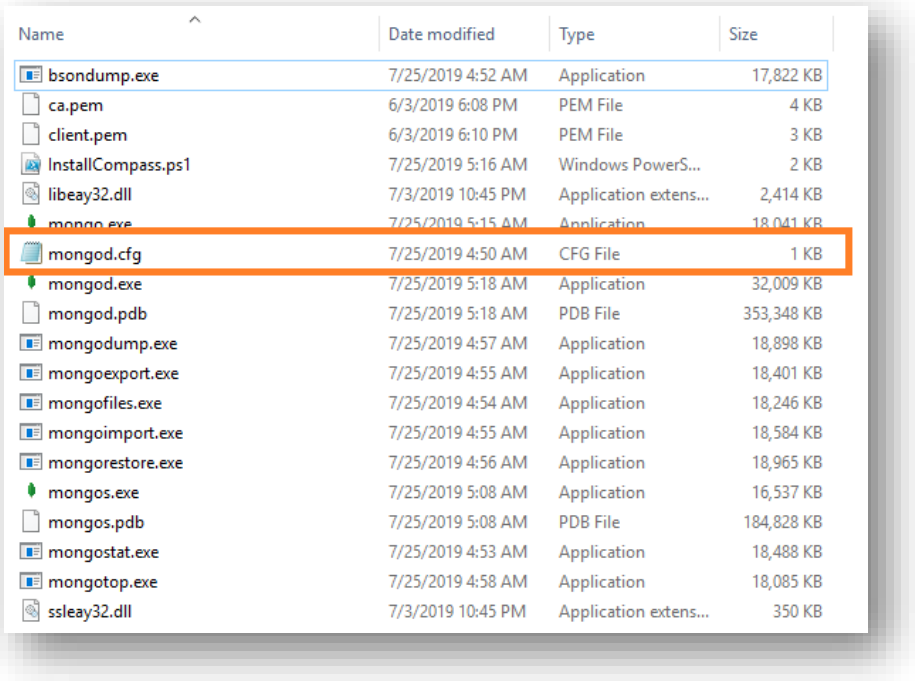


Figure 56 - MongoDB Installation - Community Version (HA) (cont.)

4. Go to the **mongo** folder that was created earlier. Inside the directory **data**, go to the **config** folder and paste the mongod.cfg file here.

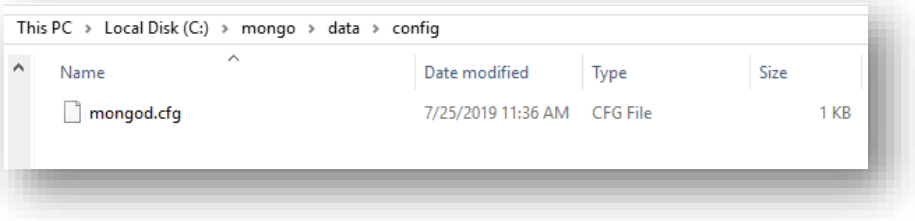


Figure 57 - MongoDB Installation - Community Version (HA) (cont.)

5. Open the file **mongod.cfg** (preferably in Notepad++ or Sublime) and follow the below steps:

While editing the file, maintaining indentation is very important.

a. In the storage header, change the following fields:
   - **dbPath**: Add path till mongo\data\database

b. In the systemLog, change the following fields:
   - **path**: Add path of mongo\data\log\mongod.log

Folder mongo\data\log doesn't have Mongod.log. This will be created automatically when mongo service is created.

c. In the net, change the following fields:
   - **port**: Enter the port you want to install MongoDB

- **bindIpAll**: true

Please do not user Port Number 27017 as it's the default port.

d. In the replication, change the following fields:

- **replSetName**: Enter the name of replica set

```
# mongod.conf

# for documentation of all options, see:
#   http://docs.mongodb.org/manual/reference/configuration-options/

# Where and how to store data.
storage:
  dbPath: C:\mongo\data\database
  journal:
    enabled: true
#  engine:
#  mmapv1:
#  wiredTiger:

# where to write logging data.
systemLog:
  destination: file
  logAppend: true
  path:  C:\mongo\data\log\mongod.log

# network interfaces
net:
  port: 27017
  bindIpAll: true
```

Figure 58 - MongoDB Installation - Community Version (HA) (cont.)

```
31  #operationProfiling:
32
33  replication:
34    replSetName:"DRYiCEReplicaSet"
35
36  #sharding:
37
```

Figure 59 - MongoDB Installation - Community Version (HA) (cont.)

6. Save the changes made in the file mongod.cfg.
7. Open **Command Prompt as Administrator** and run the following command.

Please ensure to enter the correct path of config file.

```
mongod –config "<path of the mongoDB folder you
created\mongo\data\config\mongod.cfg>" --install --serviceName
"MongoDB"

For e.g.  mongod --config "C:\mongo\data\config\mongod.cfg" --
install --serviceName "MongoDB"
```

8. MongoDB service with the name MongoDB will be created.

## 2.15.2.1.5Start MongoDB Service

1. Press **Windows+R**, then type **services.msc** and press **Enter**.

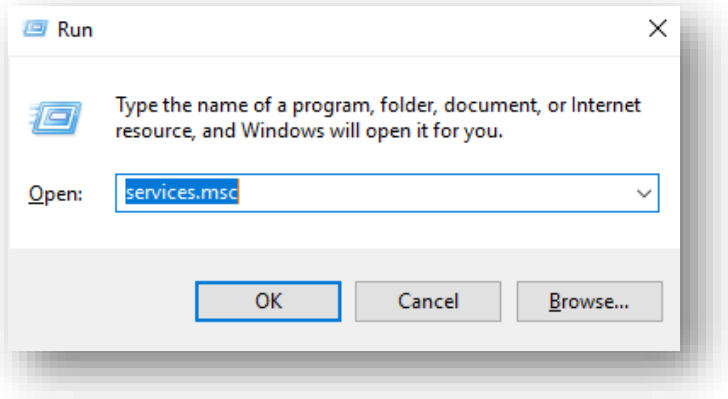


Figure 60 - MongoDB Installation - Community Version (HA) (cont.)

2. Search for the **MongoDB service** and click **MongoDB service.**
3. Click **Start the service** on the Left pane.

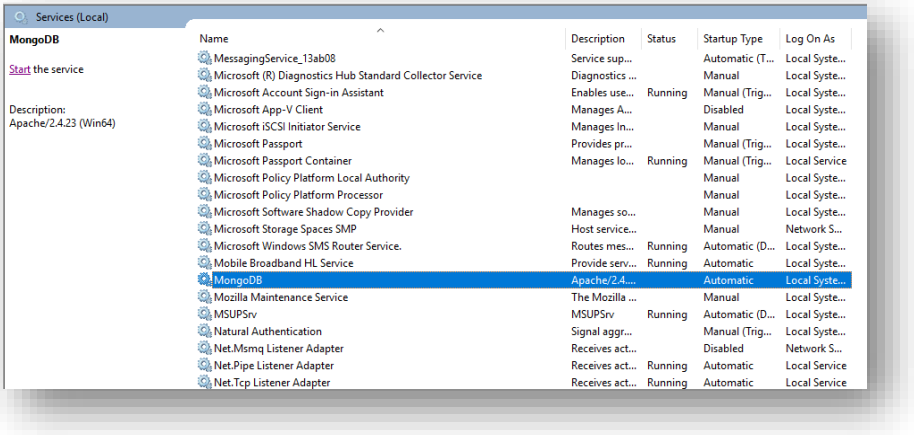


Figure 61 - MongoDB Installation - Community Version (HA) (cont.)

These steps must be performed on all the servers which are part of the replica set.

4. Go to all the servers that have MongoDB service installed.
5. Open **Command Prompt as Administrator** and execute the below command by changing respective IP and port of server.

```
mongo --host <IP> --port <port on which mongoDB service is running
(mentioned in config file)>

for e.g.
server 1: mongo --host x.x.xx.x1 --port 27017
server 2: mongo --host x.x.x.x2 --port 27017
server 3: mongo --host x.x.x.x3 --port 27017
```

6. If the service is running successfully, then connection will be established without any error message.

## 2.15.2.1.6Configure Replica Set

Once the MongoDB service is up and running, perform the below steps to configure the replica set for MongoDB.

1. Go to one of the servers that is a part of the replica set.
2. Open the **Command Prompt** as **Administrator** and execute the below command to open the terminal.

```
mongo --host <IP> --port <in which MongoDB service is running. The
one written in config >

for e.g. - mongo --host x.x.xx.x1 --port 27017
```

3. In the same terminal, execute the below commands:

```
MongoDB >  rs.initiate( {
_id : "DRYiCEReplicaSet",
members: [
{ _id: 0, host: "<IP>:<PORT>" },
{ _id: 1, host: "<IP>:<PORT>" },
{ _id: 2, host: "<IP>:<PORT>" }
                                                    ]
  })
```

4. Here, add the hosts that are part of the replica set and mention the respective host IP and port on which MongoDB service is running. Ensure that the ports are open for communication.

```
MongoDB > rs.initiate( {
_id : "DRYiCEReplicaSet",
members: [
{ _id: 0, host: "10.1.1xx.x1:27017" },
{ _id: 1, host: "10.1.1xx.x21:27017" },
{ _id: 2, host: "10.1.1xx.x3:27017" }
]
})
```

5. Enter the below command to identify the **Primary and Secondary server**:

```
MongoDB >rs.status()
```

6. Execute the below command on the **Secondary** servers:

```
MongoDB >rs.slaveOk()
```

## 2.15.2.1.7Enable Authentication

Authentication needs to be enabled only on the Primary server. All the secondary replica server will automatically be updated with the same.

To enable the authentication, perform the following steps:

1. Go to the **Primary server** in the replica set.
2. Open the **Command Prompt** as **Administrator** and execute the below command:

```
mongo --host x.x.xx.x1 --port 27017
```

3. Execute the below command:

```
MongoDB replicaTest:PRIMARY>use admin
```

4. Execute the below command. Make the following changes in the values before execution:
   - **user**:<user-name >
   - **pwd** :<password>

(choose any password for the corresponding user for MongoDB authentication.)

```
MongoDB replicaTest:PRIMARY> db.createUser(
  {
user: "admin",
pwd: "comnet123",
roles: [ { role: "userAdminAnyDatabase", db: "admin" }, { role:
"root", db: "admin" }, "readWriteAnyDatabase" ]
}
)
```

5. After this is successfully executed in the primary server of replica set, make the following changes in mongod.cfg of all the servers that are part of replica set. Refer the screenshot below:

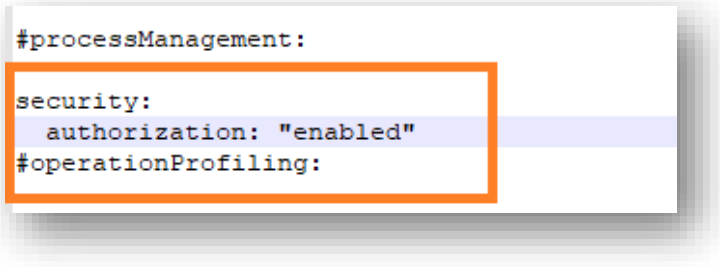


Figure 62 - MongoDB Installation - Community Version (HA) (cont.)

6. Close the terminal and restart the MongoDB service of all servers in the replica set.

7. Re-open the **Command Prompt** as **Administrator** on all the servers in the replica set and connect to MongoDB using the below command:

```
mongo --host <IP> --port <Port>-u <username> -p <password> --
authenticationDatabase "admin"

For e.g. –
mongo --host x.x.xx.x1 --port 27017 -u admin -p comnet123 --
authenticationDatabase "admin"
mongo --host x.x.xx.x2 --port 27017 -u admin -p comnet123 --
authenticationDatabase "admin"
mongo --host x.x.xx.x3 --port 27017 -u admin -p comnet123 --
authenticationDatabase "admin"
```

8. Connection with MongoDB should be successfully established on both Primary and Secondary servers.

## 2.15.2.1.8Test the Connection

To test the connection, perform the following steps:

Python 3.6 should be present. You should also have the BigFix Runbook AI installer package as it contains some resources to be used in subsequent steps.

1. Open the **Command Prompt** as **Administrator** and execute the following command to install pymongo.

```
pip install pymongo
```

2. Copy the file named "**mongo_connection_community_HA.py**", present in the installer package under iAutomateInstaller → Resources → Resources.zip folder, to any folder.
3. Open the file in **Notepad** and change the respective **IP**, **port**, **username**, **password** where MongoDB service is running.

Please preserve spaces and indentation.

```
import ssl

from pymongo import MongoClient

client =
MongoClient(['10.1X.1XX.XX:27017','10.1X.1XX.6X:27017','10.1X.1XX.
XX:27017'],
                                    username='admin',
                                       password='comnet123',
```

```
                                        ssl=False)

db = client['DRYiCE_db']
db_collection = db['DRYiCE_Collection']

db_collection.insert({"name":"xyz"})
print("Connection to Mongo Database successful")
```

4. Open the **Command Prompt** as **Administrator** mode and change the current working directory to the folder that has code using the following command:

```
cd <folder path>
```

5. Execute the code by executing the following command:

```
python <file_name.py>
```

6. If file executes without any error, then connection is successful.

## 2.15.2.2Enterprise Version

This section describes the procedure for installation of MongoDB with authentication and authorization configured for Enterprise Edition in HA mode.

Important note:

- Please ensure the ports that are to be used for MongoDB service is open for communication with the help of Windows administrator.
- During the installation procedure whenever the MongoDB service is restarted, open the new command prompt to run the further commands.

### 2.15.2.2.1Installation steps:

1. Download the file **mongodb-win32-x86_64-enterprise-windows-64-4.0.25-signed.mse** from the Path mentioned in the source field of Table 14 – MongoDB Requirements for Enterprise Version.
2. Double-click on **mongodb-win32-x86_64-enterprise-windows-64-4.0.25-signed.mse** file, select installation option as **Complete** and click **Next**.

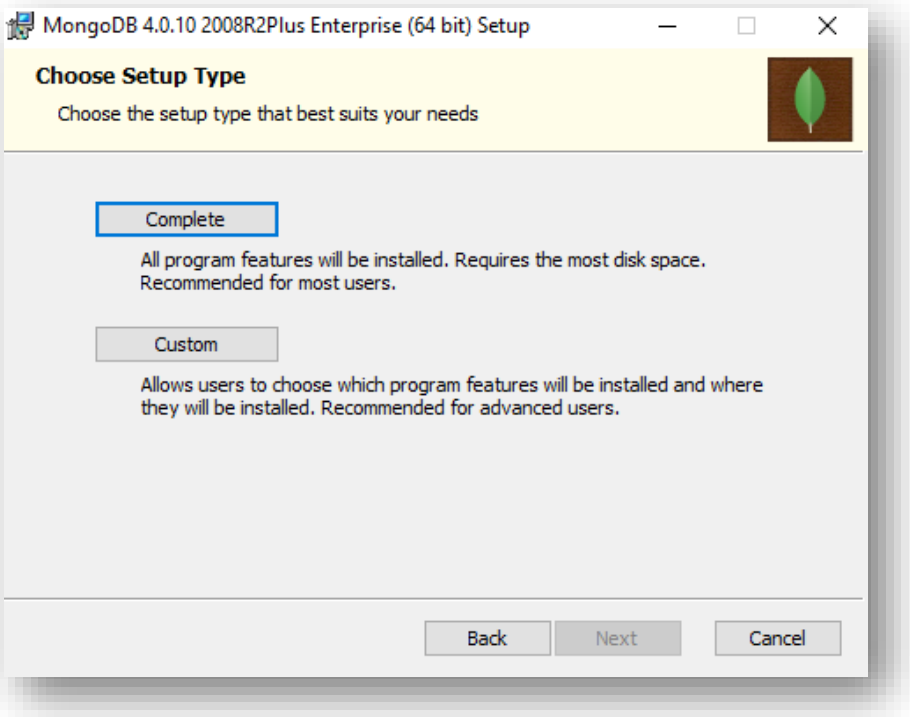


Figure 63 - MongoDB Installation - Enterprise Version (HA)

3. Please ensure to note the location of the installation directory of MongoDB.
4. The option **Install MongoDB as service** would be checked by default.

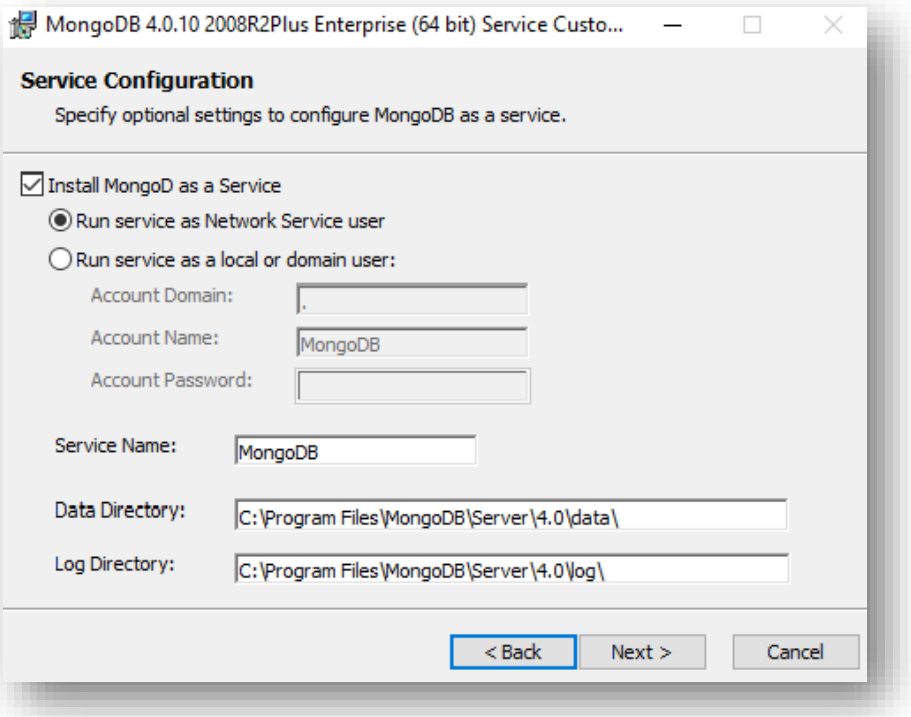

Figure 64 - MongoDB Installation - Enterprise Version (HA) (Cont.)

5. Uncheck **Install MongoDB as service** and click **Next**.

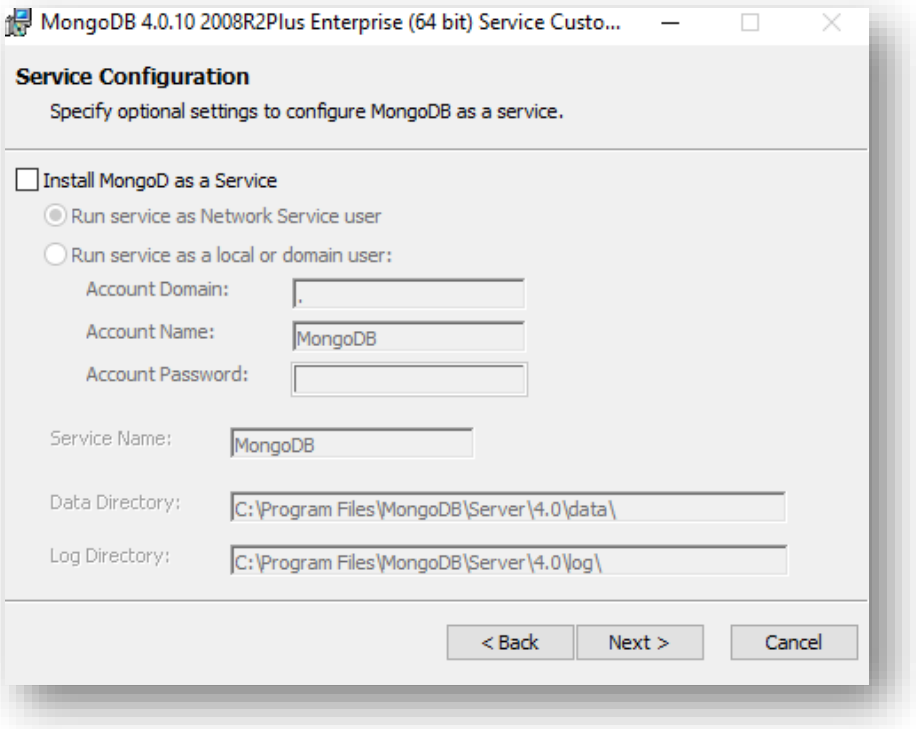


Figure 65 - MongoDB Installation - Enterprise Version (HA) (Cont.)

6. Wait till the MongoDB installation is complete.

## 2.15.2.2.2Add MongoDB to the Path:

To add MongoDB to the PATH, please perform the below steps:

1. Go to location where MongoDB was installed. For e.g., ***C:\Program Files\MongoDB***.
2. Inside MongoDB, go to ***folder \Server\4.0\bin***.
3. Go to **Control Panel → System and Security →Security**.
4. Select **Advanced System Settings**, click **Environment Variables**. This will open a new dialog box.
5. Select the variable path in **System Variables** and add path of MongoDB. For e.g. - ***C:\Program Files\MongoDB\Server\4.0\bin***.

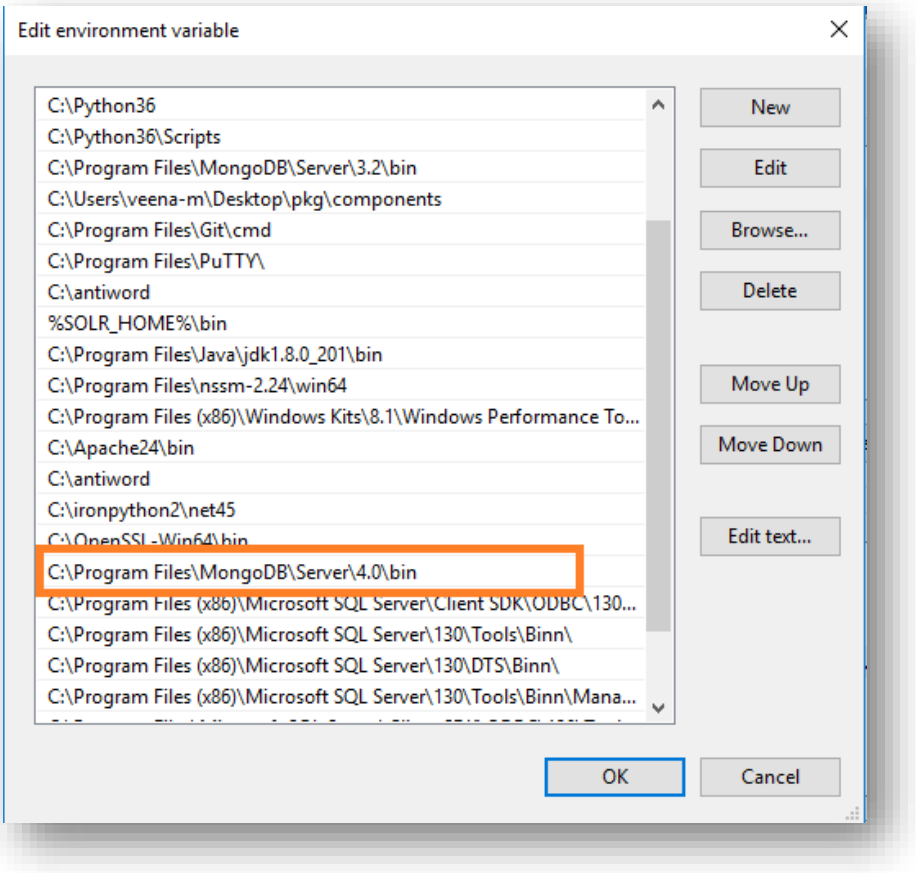


Figure 66 - MongoDB Installation - Enterprise Version (HA) (Cont.)

## 2.15.2.2.3Creation of Directory Structure:

1. Create a folder named **mongo**. It should not be in the same location where MongoDB is installed.
2. Inside the folder **mongo**, create a folder named **data**.
3. Inside the folder **data**, create three folders named as **config**, **database**, and **log**.

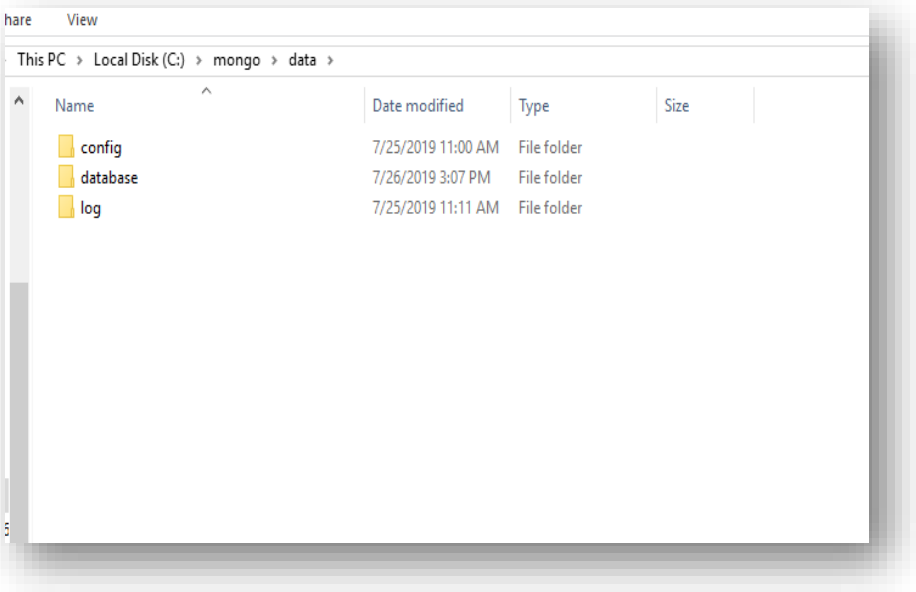


Figure 67 - MongoDB Installation - Enterprise Version (HA) (Cont.)

## 2.15.2.2.4Creation of MongoDB Service

1. Go to the location where MongoDB is installed. Refer to the Path set in the PATH environment variable. For e.g., ***C:\Program Files\MongoDB***.
2. Go to bin folder. For e.g., ***C:\Program Files\MongoDB\Server\4.0\bin***.
3. Locate the file named **mongod.cfg** and copy the file.

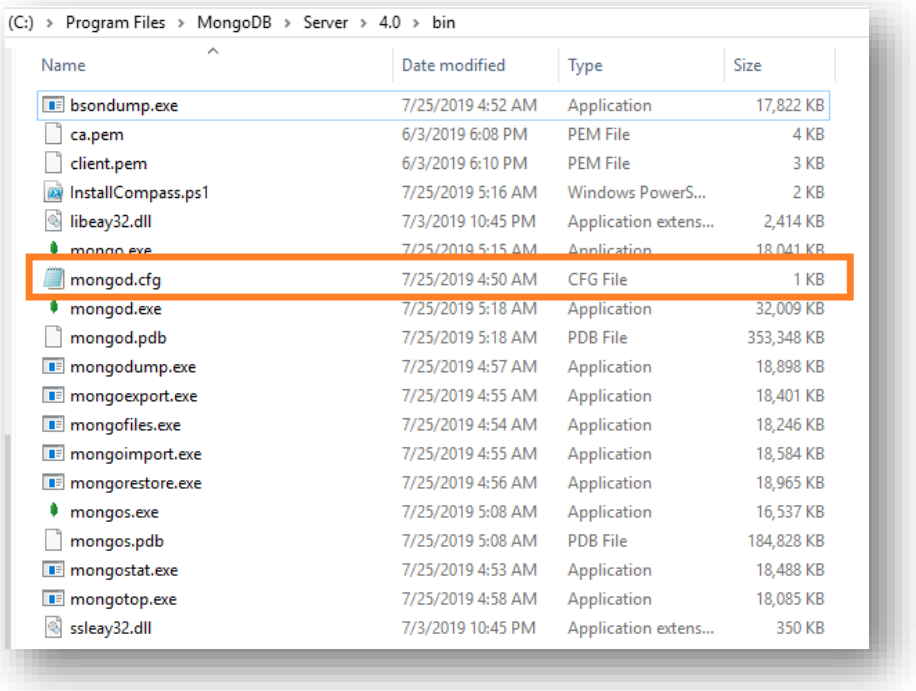


Figure 68 - MongoDB Installation - Enterprise Version (HA) (Cont.)

4. Go to the **mongo** folder that was custom created earlier. Inside the directory **data**, go to the **config** folder. Paste the mongod.cfg file here.

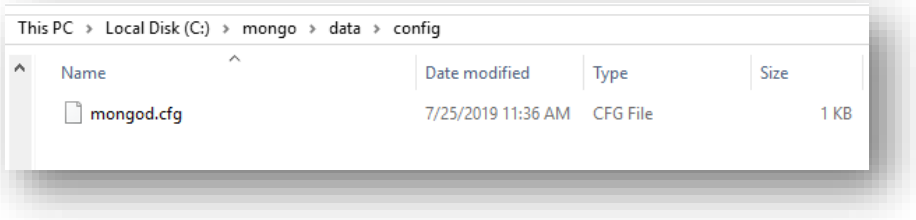


Figure 69 - MongoDB Installation - Enterprise Version (HA) (Cont.)

5. Open the file mongod.cfg (preferably in Notepad++ or Sublime) and follow the below steps:

While editing the file, maintaining indentation in the file is very important.

   a. In the storage header, change the following fields:
      - **dbPath**: Add path till mongo\data\database.
   b. In the systemLog, change the following fields:
      - **path**: Add path of mongo\data\log\mongod.log.

Folder mongo\data\log doesn't have Mongod.log. This will be created automatically when mongo service is created.

c. In the net, change the following fields:
   - **port**: Enter the port you want to install MongoDB.
   - **bindIpAll**: True.

d. In the replication, change the following fields:
   - **replSetName**: Enter the name of the replica set.

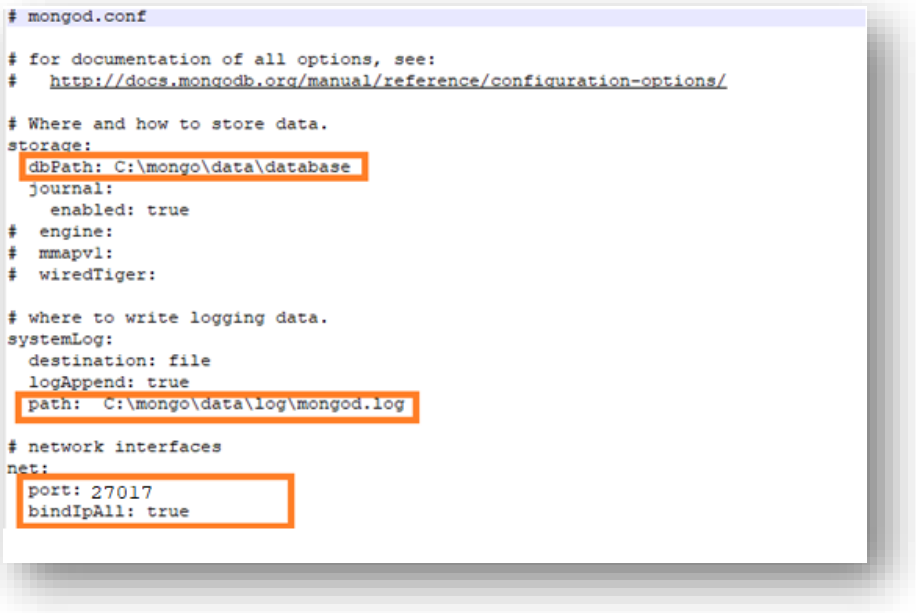


Figure 70 - MongoDB Installation - Enterprise Version (HA) (Cont.)

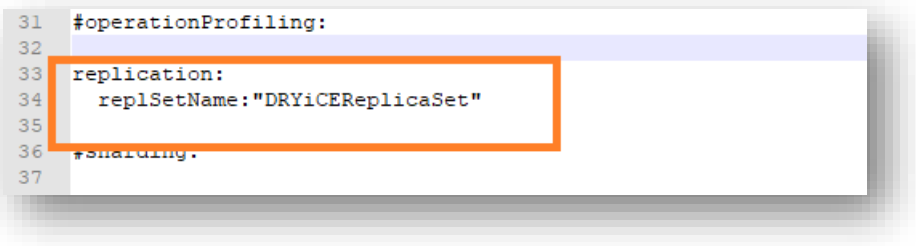


Figure 71 - MongoDB Installation - Enterprise Version (HA) (Cont.)

6. Save the changes made in the file mongod.cfg.
7. Open the **Command Prompt** as **Administrator** and run the following command.

```
mongod -config "<path of the mongoDB folder you
created\mongo\data\config\mongod.cfg>" --install --serviceName
"MongoDB"

For e.g.  mongod --config "C:\mongo\data\config\mongod.cfg" --
install --serviceName "MongoDB"
```

Ensure to enter the correct path of config file.

8. MongoDB service with the name MongoDB will be created.

## 2.15.2.2.5Start MongoDB Service

1. Press **Windows+R**, type **services.msc** and press **Enter**.

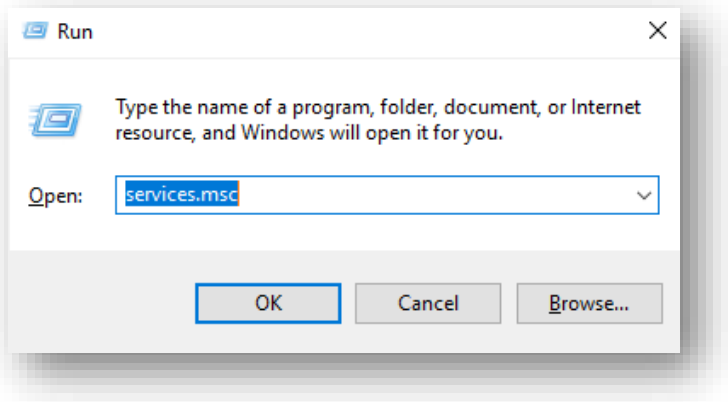


Figure 72 - MongoDB Installation - Enterprise Version (HA) (Cont.)

2. Search for **MongoDB service**, then click on it and click **Start the service** on the Left pane.

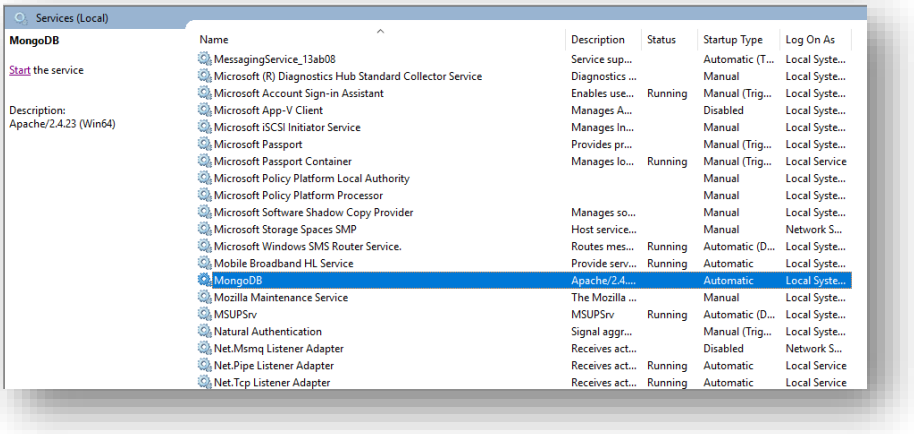


Figure 73 - MongoDB Installation - Enterprise Version (HA) (Cont.)

These steps must be performed on all the servers that are part of the replica set.

3. Go to all the servers that have MongoDB service installed.
4. Open the **Command Prompt** as **Administrator** and execute the below command by changing respective IP and port of server.

Ensure that the port on which MongoDB service is running is open for communication.

```
mongo --host <IP> --port <port on which mongoDB service is
running(mentioned in config file)>

for e.g.
```

```
server1: mongo --host x.x.x.x1 --port 27017
server2: mongo --host x.x.x.x2 --port 27017
server3: mongo --host x.x.x.x3 --port 27017
```

5. If the service is running successfully, then connection will be established without any error message.

## 2.15.2.2.6Configure Replica Set

Once the MongoDB service is up and running, perform the below steps to configure the replica set for MongoDB.

1. Go to one of the servers that is a part of the replica set.
2. Open the **Command Prompt** as **Administrator** and execute the below command to open the terminal.

```
mongo --host <IP> --port <in which MongoDB service is running. The
one written in config >

for e.g. - mongo --host x.x.xx.x1 --port 27017
```

3. In the same terminal, execute the below commands:

```
MongoDB >  rs.initiate( {
_id : "DRYiCEReplicaSet",
members: [
{ _id: 0, host: "<IP>:<PORT>" },
{ _id: 1, host: "<IP>:<PORT>" },
{ _id: 2, host: "<IP>:<PORT>" }
]
})
For eg.,
MongoDB > rs.initiate( {
   _id : "DRYiCEReplicaSet",
    members: [
      { _id: 0, host: "10.1.1xx.x1:27017" },
      { _id: 1, host: "10.1.1xx.x21:27017" },
      { _id: 2, host: "10.1.1xx.x3:27017" }
     ]
  })
```

4. Here, add the hosts that are part of the replica set. Also mention the respective host IP and port on which MongoDB service is running. Ensure that the ports are open for communication.
5. Enter the below command to identify the **Primary** and **Secondary** server.

```
MongoDB >rs.status()
```

6. Execute the below command on the Secondary servers.

```
MongoDB >rs.slaveOk()
```

## 2.15.2.2.7Enable Authentication

Authentication needs to be enabled only on the Primary server. The Secondary servers are automatically updated as they are part of the replica set.

To enable the authentication, perform the following steps:

1. Go to the primary server in the replica set.
2. Open the **Command Prompt** as **Administrator** and execute the below command:

```
mongo --host x.x.xx.x1 --port 27017
```

3. Execute the below command:

```
MongoDB Enterprise replicaTest:PRIMARY>use admin
```

4. Execute the below command. Make the following changes in the values before execution:
   - **user**:<user-name >
   - **pwd** :<password>

(choose any password for the corresponding user for MongoDB authentication.)

```
MongoDB Enterprise replicaTest:PRIMARY>db.createUser(
{
user: "admin",
pwd: "comnet123",
roles: [ { role: "userAdminAnyDatabase", db: "admin" }, { role:
"root", db: "admin" }, "readWriteAnyDatabase" ]
}
)
```

After this is successfully executed in the primary server of replica set, make the following changes in mongod.cfg of all the servers that are part of replica set. Refer the screenshot below:

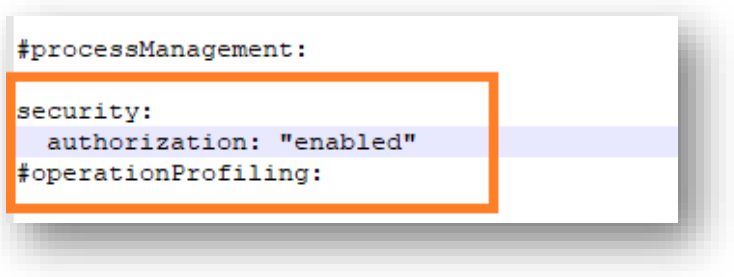


Figure 74 - MongoDB Installation - Enterprise Version (HA) (Cont.)

5. Close the terminal and restart the MongoDB service of all the servers in the replica set.
6. On all the server's part of the replica set, open the **Command Prompt** as **Administrator** and open the MongoDB terminal using the following command:

```
mongo --host <IP> --port <Port> -u <username> -p <password> --
authenticationDatabase "admin"
For e.g.
mongo --host x.x.xx.x1 --port 27017 -u admin -p comnet123 --
authenticationDatabase "admin"
mongo --host x.x.xx.x2 --port 27017 -u admin -p comnet123 --
authenticationDatabase "admin"
mongo --host x.x.xx.x3 --port 27017 -u admin -p comnet123 --
authenticationDatabase "admin"
```

7. Connection with MongoDB should be successfully established on both primary and secondary servers.

## 2.15.2.2.8Enable SSL Authentication

To enable SSL authentication, perform the following steps:

Please ensure that only one **ca.pem** should be generated. From the same **ca.pem, server.pem** for each server should be generated. From the same **ca.pem, client.pem** should be generated**.**

If this is not done properly, it may result in failure of SSL Authentication and replica set server may become unreachable.

1. Generate the ca.pem, server.pem and client.pem by referring to the Generate ca.pem and server.pem and Generate client.pem.
2. After the ca.pem, client.pem and server.pem are generated, copy these files, and paste them in the path below:

```
<MongoDB_installed_path>/MongoDB/Server/4.0/bin
```

```
For e.g. - C:\Program Files\MongoDB\Server\4.0\bin
```

server.pem generated for the respective servers should be placed in the same server.

3. Go to folder **mongo/data/config**, then open the file **mongod.cfg** and make the following changes.

Please preserve the space and indentations as shown in the screen shot below. Ensure that editing is done in notepad++.

a. In the **net header**, edit the following:

```
ssl:
      mode: allowSSL
      PEMKeyFile: C:\Program
Files\MongoDB\Server\4.0\bin\server.pem
      CAFile: C:\Program Files\MongoDB\Server\4.0\bin\ca.pem
```


Figure 75 - MongoDB Installation - Enterprise Version (HA) (Cont.)

4. Save the file for changes to be reflected.
5. After making the changes in all the servers of the replica set, Restart the MongoDB services on all the servers.
6. Open **Command Prompt** as **Administrator** on all the servers and execute the below command:

```
mongo --ssl --host <IP> --port <port> -u <username> -p <password>
--authenticationDatabase "admin" --sslCAFile "<path of ca.pem>" --
sslPEMKeyFile "<path of client.pem>"
```

7. Add the respective **IP**, **port**, **path of the pem file** in all the servers.

```
for e.g. -
mongo --ssl --host 10.x.x.x1 --port 27017 -u admin -p comnet123 --
authenticationDatabase "admin" --sslCAFile "C:\Program
Files\MongoDB\Server\4.0\bin\ca.pem" --sslPEMKeyFile "C:\Program
Files\MongoDB\Server\4.0\bin\client.pem"
```

This will help in establishing the connection with MongoDB.

8. Execute the below commands in all the servers of the replica sets.

```
MongoDB Enterprise replicaTest:PRIMARY>db.adminCommand( {
setParameter: 1, sslMode: "preferSSL" } )
    MongoDB Enterprise replicaTest:PRIMARY>db.adminCommand( {
setParameter: 1, sslMode: "requireSSL" } )
```

9. Restart the **MongoDB** service on all the servers in the replica set.

## 2.15.2.2.9Test the Connection

To test the connection, perform the following steps:

Python 3.6 should be present. You should also have the BigFix Runbook AI installer package as it contains some resources to be used in subsequent steps.

1. Open **Command Prompt as Administrator** and execute the following command:

```
pip install pymongo
```

2. Copy the file named "**mongo_connection_enterprise_HA.py**", present in the installer package under **iAutomateInstaller → Resources →Resources.zip** folder, to any folder.
3. Open the file in **Notepad** and change the value of **IP**, **port**, **username**, **password**, **certificate path** where **MongoDB** service is running**.**

```
import ssl

from pymongo import MongoClient


client = MongoClient([<IP of the server>:<Port>,<IP of the
server>:<Port>,<IP of the
server>:<Port>],username='<Username>',password='<Password>',ssl=Tr
ue,
                                     ssl_certfile="<path of
client.pem file>",
                                     ssl_ca_certs="<path of ca.pem
file>",
                     ssl_cert_reqs=ssl.CERT_REQUIRED)

db = client['DRYiCE_db']
db_collection = db['DRYiCE_Collection']

db_collection.insert({"name":"xyz"})
print("Connection to Mongo Database successful")
```

4. Open **Command Prompt** as **Administrator** and change the current working directory to the folder that has code using the following command:

```
cd <folder path>
```

5. Execute the code by using the following command:

```
python <file_name.py>
```

6. If file executes without any error, then connection is successful.

# 2.16Apache SOLR

Table 15 – Apache SOLR Requirements

| | |
|---|---|
| Version | Solr 8.5.0 |
| Purpose | It is used an indexer for searching information from documents. It is also used for maintaining pre-downloaded repository document mappings. |
| Prerequisites | Installation of Java |
| Source | This is available as part of BigFix Runbook AI installer package.<br>**For Solr**: Follow the below path:<br><br>Pre-Requisite Software → solr-8.5.0.zip<br>**For NSSM**: Follow the below path:<br><br>Pre-Requisite Software → nssm-2.24.zip |
| Config | Available as part of BigFix Runbook AI installer package. Follow the below path:<br><br>Pre-Requisite Software → Solr_8.5_Prereq.zip |

Apache Solr is an open-source enterprise search platform. It is being used as indexer in BigFix Runbook AI to search for relevant document based on context. In BigFix Runbook AI, it is used to provide the relevant knowledge articles based on the ticket descriptions. Users can also search for the knowledge articles proactively.

Apache Solr can be configured in two modes i.e., HA or non-HA mode. In non-HA mode, user will need to configure only one instance of Solr in Cloud mode where zookeeper will be in-built provided by Solr.

However, in HA mode user will need to configure separate zookeeper cluster. Zookeeper cluster should have at least 3 servers and if user wants to further increase the same then it should be odd in numbers.

Please ensure that the user has at least two Solr instances which are connected via load balancer. In HA mode, all instances of Apache Solr have point in-time data replication i.e., all Solr instances are in read and write mode.

## 2.16.1SOLR Installation – High Availability (HA) Mode

This section describes the procedure for installation of Solr in HA mode which is integrated with Zookeeper. This is applicable only for Windows Sever.

For **Apache Solr in H.A**, configure **Zookeeper on at least three different servers** because for ZooKeeper cluster to be active, there must be a majority of non-failing machines that can communicate with each other. For this reason, ZooKeeper cluster is usually made up of an odd number of machines. It runs as an ensemble of ZooKeeper servers i.e., Zookeeper cluster. User must integrate Zookeeper cluster with **two Solr node running on different servers** that are connected with Load Balancer.

Minimum configuration for each of the servers are explained below:

- Windows Server 2016 with 64-bit Processor
- 2 GB of RAM, and 80GB HDD hard drives
- 2 Cores

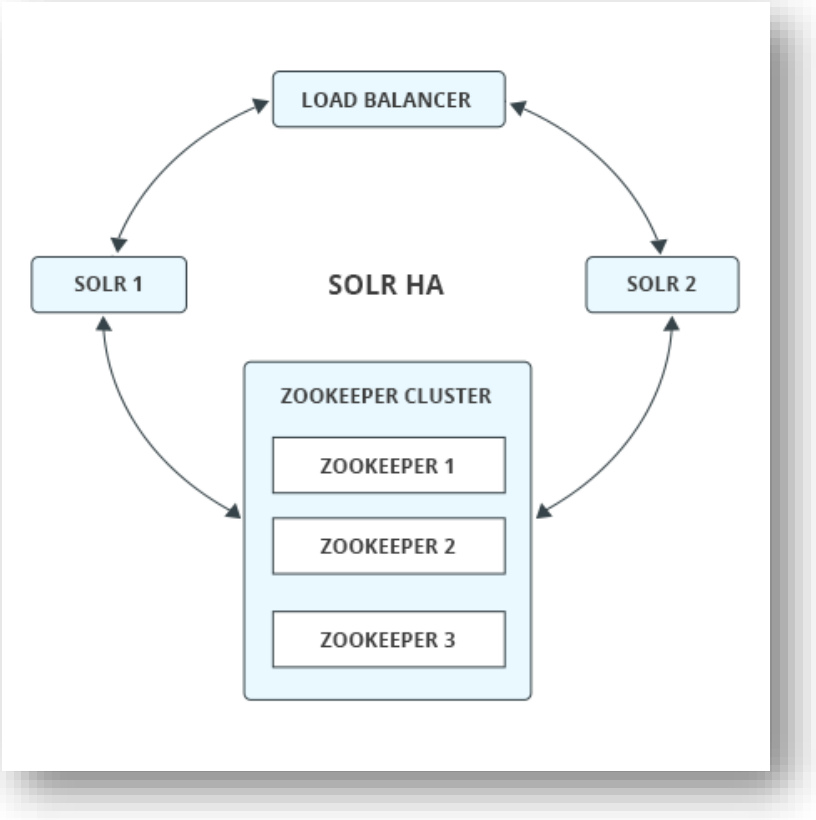


Figure 76 - Installation of Solr in HA – Architecture

## 2.16.1.1Installation of Zookeeper

Table 16 – Zookeeper Requirements

| | |
|---|---|
| Source | Available as part of BigFix Runbook AI installer package. Follow the below path:<br><br>Pre-Requisite Software → zookeeper-3.6.3.zip |

This section describes the procedure for installation of Zookeeper. Please perform the below steps:

1. Download zookeeper-3.6.3.zip **file** from the path mentioned in the source field of Table 16 – Zookeeper Requirements on all three servers.
2. Copy the zookeeper.zip folder in the desired location and extract it.
   e.g. - D:\zookeeper
3. Ensure that Java version 1.8 or higher is configured in the system and JAVA_HOME variable is set.
   To check the same, open the **Command Prompt** and type the below command:

```
Java -version
```

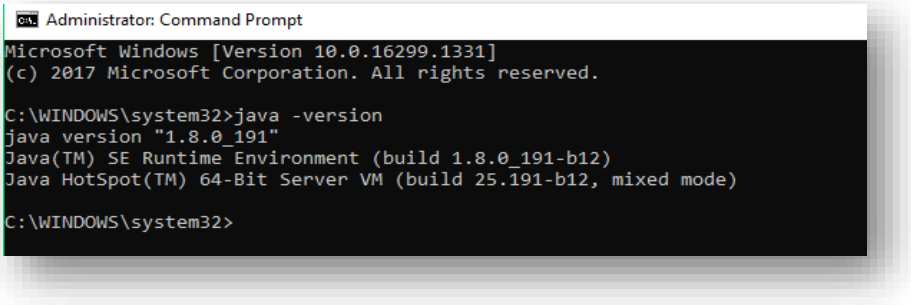


Figure 77 - Installation of ZooKeeper

4. Proceed with the installation if the Java version is displayed. If not, please install Java as mentioned in section Java.
5. Go to the zookeeper installation directory where zookeeper was extracted.
6. Go to **<zookeeper_install_dir>/conf** folder, rename the zoo_sample.cfg file to zoo.cfg.
7. Create a folder inside zookeeper directory with name dataDir. For doing this, go inside the zookeeper installation directory, open the **Command Prompt** as **Administrator** and type:

```
mkdir dataDir
```

8. Go to ***<zookeeper_install_dir>/conf*** folder and open **zoo.cfg** file. Change the below parameters and add details of three zookeeper servers. Here you need to select three distinct zookeeper ids for three distinct servers. (Keep it numeric).

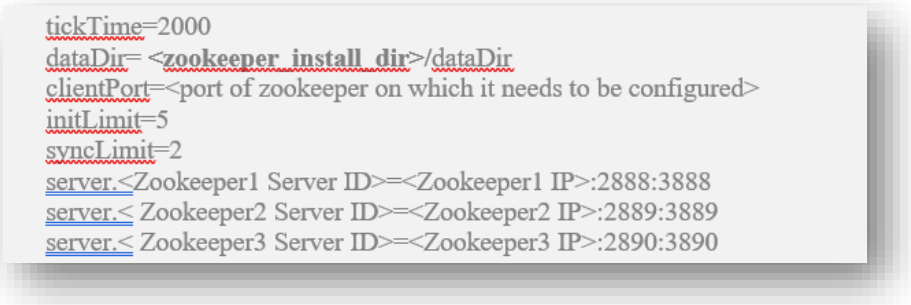


Figure 78 - Installation of ZooKeeper (cont.)

9. Enter the same parameter details in **zoo.cfg** file.

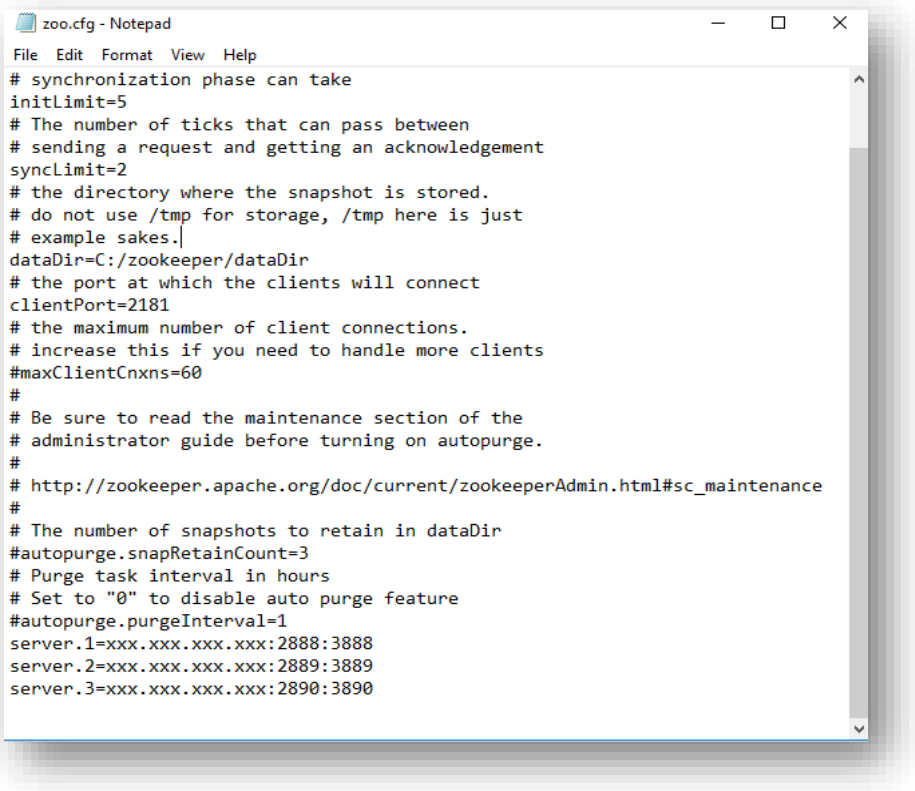


Figure 79 - Installation of Zookeeper (cont.)

For Reference, zookeeper will use these ports (2888, 2889,….) to connect the individual follower nodes to the leader nodes. The other ports (3888, 3889,….) are used for leader election in the ensemble. Make sure all these ports must be different from each other.

10. Go to *<zookeeper_install_dir>* and open **Command Prompt as Administrator** and type the below command:

```
(echo<Zookeeper Server ID>)>dataDir/myid
```

e.g. – (echo 1)>dataDir/myid

This command will create a file inside dataDir folder with name **myid** and add the server ID. The server ID is a number between 1-255, and it must be unique. Also it must correspond with server.${id} in the zoo.cfg files.

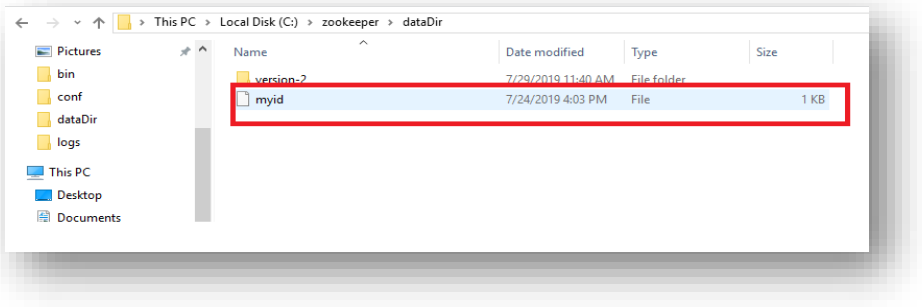


Figure 80 - Installation of Zookeeper (cont.)

11. In above example followed, there are 3 server IDs 1, 2 and 3. So, for the respective server, it's **zoo.cfg** should contain its respective id.
12. Go to the **bin** folder and open the **Command Prompt** as **Administrator** inside *<zookeeper_install_dir>*.
13. Start **Zookeeper** by executing the following command:

```
zkServer.cmd
```

14. Now Zookeper is running at *<IP_address>:<port>* (User can change the port in the zoo.cfg file with field name i.e., client Port).
15. User may see some error in the terminal, if other two zookeepers were not started. Ignore this error for now, until all three Zookeeper starts.
16. Configuration is ready for the first Zookeeper node.

## 2.16.1.2Enabling Zookeeper as Windows Service

This section describes the procedure for enabling Zookeeper as a Windows service. Please perform the below steps:

1. Download nssm-2.24.zip file from the path mentioned in the source field of Table 15 – Apache SOLR Requirements and unzip it.
2. Copy **nssm.exe** from **nssm-2.24\win64 to <zookeeper_install_dir >\bin**.
3. Go to the bin folder i.e., < *zookeeper_install_dir* >*bin* and open the Command Prompt as Administrator.
4. Execute the below command:

```
nssm install zookeeper
```

5. The below window will be displayed.

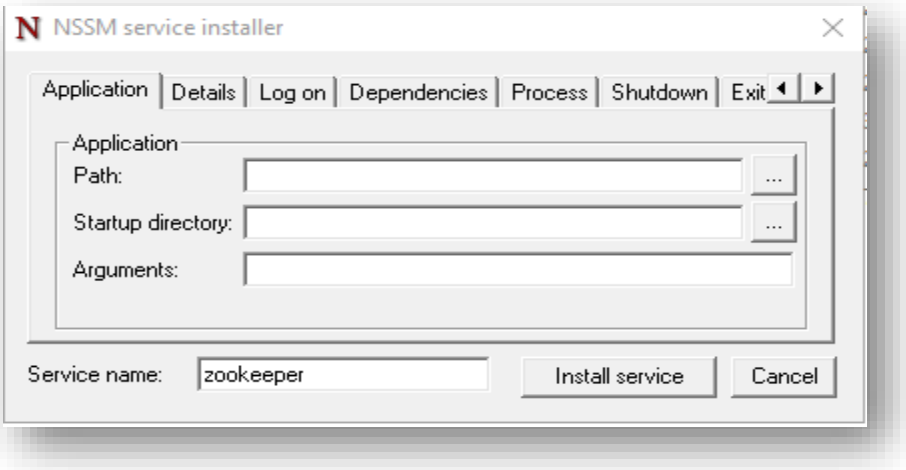


Figure 81 - Enabling Zookeeper as Windows Service

6. Click **Application** tab and enter the information as mentioned below:

```
Path: <zookeeper_install_dir> \bin\zkServer.cmd
Startup Directory: <zookeeper_install_dir> \bin
```

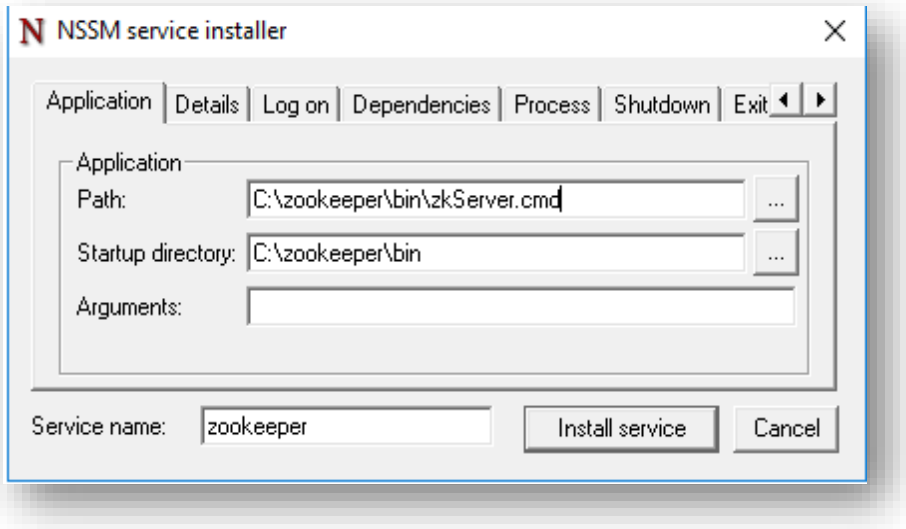


Figure 82 - Enabling Zookeeper as Windows Service (cont.)

7. Click **Details** tab and enter the information as displayed in the image below:

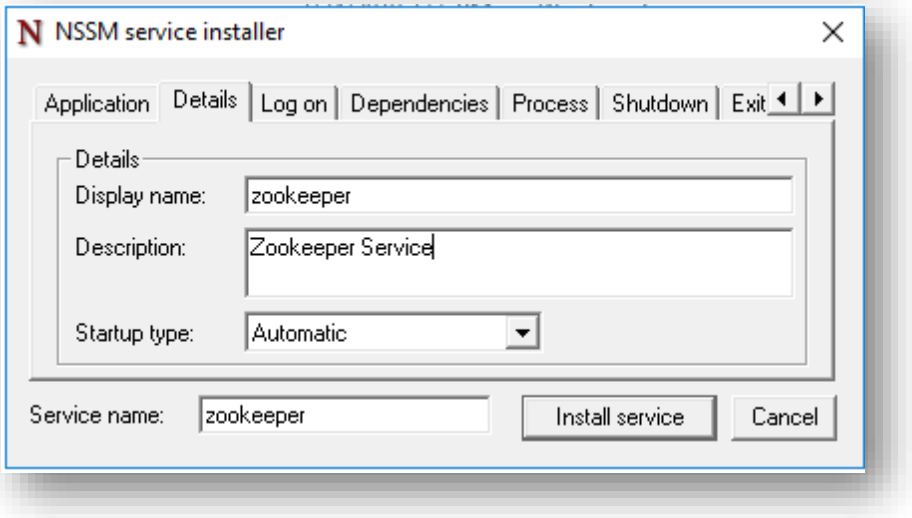


Figure 83 - Enabling Zookeeper as Windows Service (cont.)

8. Click **Install Service**.
9. Upon successful installation, following message will appear.

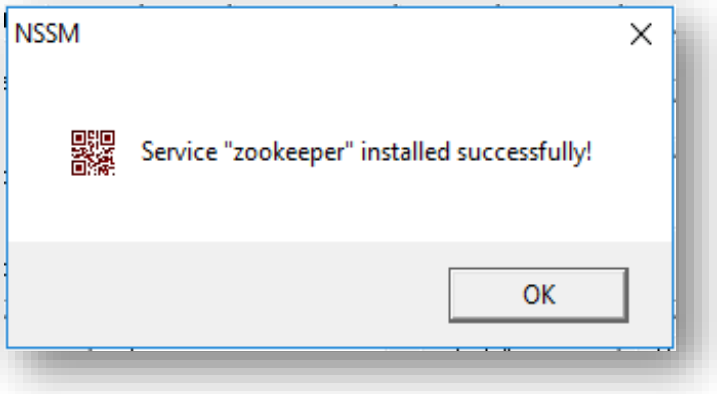


Figure 84 - Enabling Zookeeper as Windows Service (cont.)

10. Press **Win+R**, type **services.msc** and press **OK**.

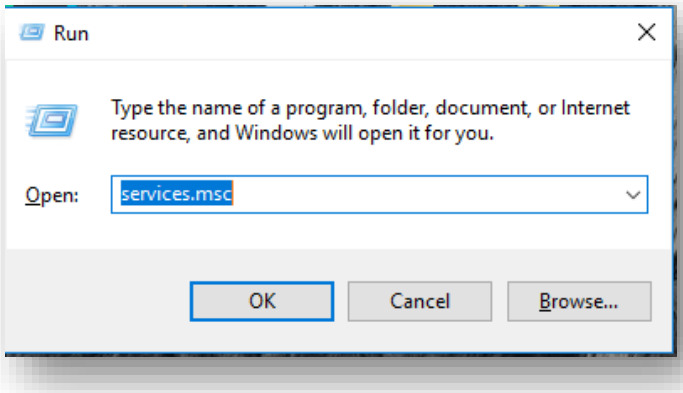

Figure 85 - Enabling Zookeeper as Windows Service (cont.)

11. Search for **zookeeper** service and click on **zookeeper** service.
12. Click **Start the service** on the left panel to start the service.

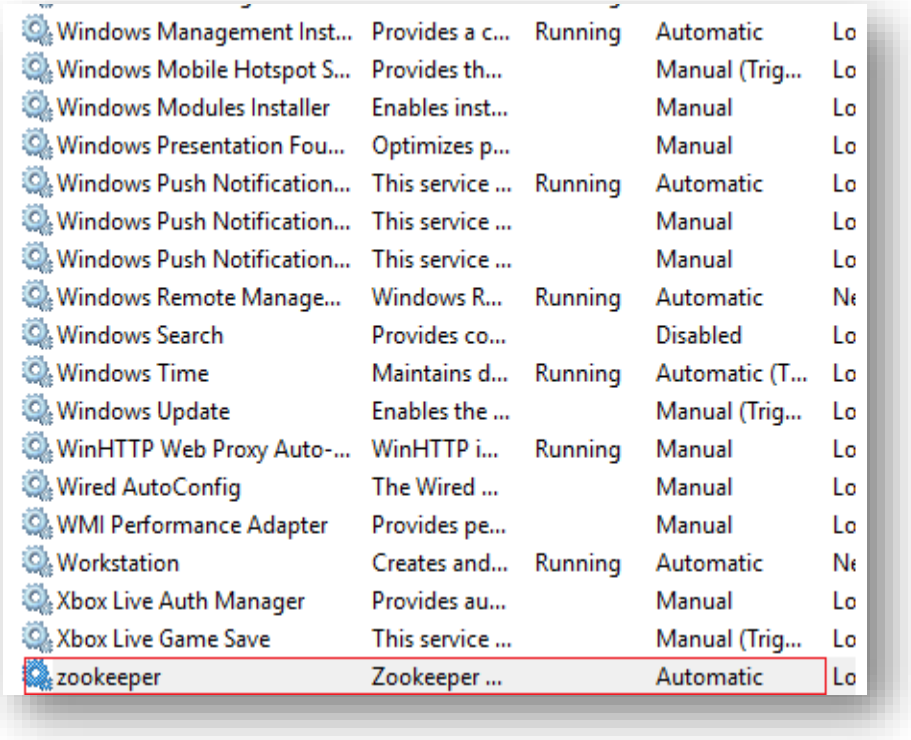


Figure 86 - Enabling Zookeeper as Windows Service (cont.)

## 2.16.1.3Installation of SOLR

This section describes the procedure for installation of Solr. As per the best practices, Solr instances (preferably two or more in number) should be configured on different servers, different from the servers where ZooKeeper cluster has been set up.

Please follow the below steps for each of the Solr instances:

1. Download the folder **solr-8.5.0 .zip file** from the Path mentioned in source field of Table 14 – Apache SOLR Requirements.
2. Extract zip file to desired location.
   e.g.: ***D:\solr***
3. Ensure that **Java version 1.8** or higher is configured in the system. And **JAVA_HOME** variable is set.
   To check the same, open the **Command Prompt** and type the below command:

```
java -version
```

4. Proceed with the installation if the Java version is displayed. If not, please install Java as mentioned in Java.
5. Set **SOLR_HOME** environment variable and add to **PATH** environment variable. Follow the below steps to set the **SOLR_HOME** and **PATH.**
   a. Go to Control Panel → System and Security → Advanced System Settings.
   b. Click **Environment Variables**. A new dialog box appears.

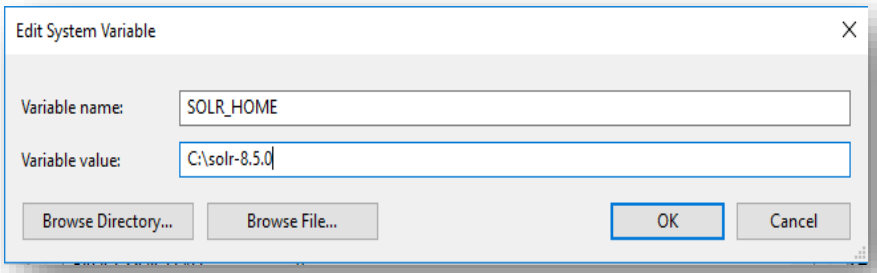


Figure 87 - Installation of SOLR

   c. Select **Path** in **System Variables** and add the respective path of Solr mentioned above.
   d. Set the environment variable as depicted in the image above.
   e. Add **%SOLR_HOME%\bin** to **PATH** environment variable.

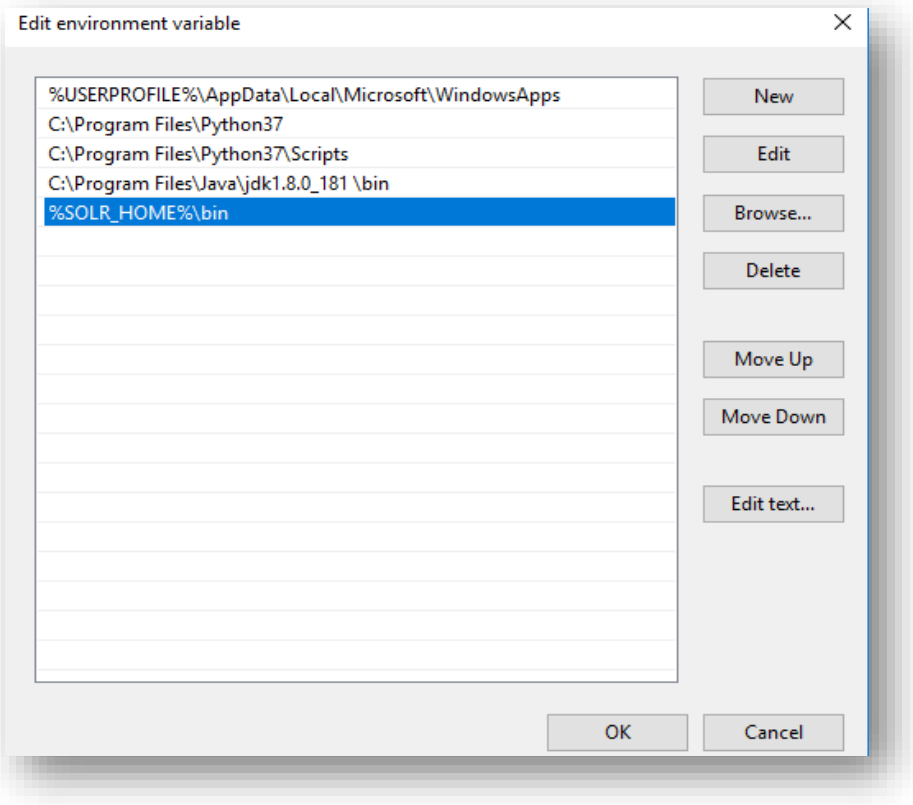


Figure 88 - Installation of SOLR (cont.)

6. Navigate to **SOLR_HOME\bin.** Open the **Command Prompt** as **Administrator** and execute the below command:

```
solr start -cloud -s <SOLR_HOME\server\solr> -p <PORT> -z
<ZOOKEEPER_IP_1>:<ZOOKEEPER_PORT_1>,
<ZOOKEEPER_IP_2>:<ZOOKEEPER_PORT_2>,<ZOOKEEPER_IP_3>:<ZOOKEEPER_PO
RT_3>
```

7. Enter the **IP address** and the **Port** as shown in below example in the respective fields:

```
e.g. -
solr start -cloud -s "C:\solr\solr-8.5.0\server\solr" -p 8983 -z
"1x.xx.xx.x1:2181,1x.xx.1xx.x2:2181,1x.xx.xx.x3:2181"
Here,
-p for port, you can choose another port
-h for hostname/IP
-s for path where solr.xml and zoo.cfg is present
-SOLR_HOME is solr path till /solr-8.5.0
-z List of comma separated: Zookeeper IP with port
```

8. Create a folder named **iAutomateSolr** in the directory path *SOLR_HOME\server\solr\configsets*.

9. This step requires the two conf folders (that contains schema.xml and solrconfig.xml) from path mentioned in Table 14 – Apache SOLR Requirements. Please reach out to iAuto-Product-Supp@hcl.com to get access to the folder.
10. Copy the two conf folder received to the 'iAutomateSolr' folder created in previous steps.
11. Navigate to *SOLR_HOME\server\scripts\cloud-scripts*. Open the Command Prompt as Administrator and execute the below command for all three Zookeeper servers, for each of the two conf folders with different schema names, respectively.

```
zkcli.bat -zkhost <ZOOKEEPER_IP>:<ZOOKEEPER_PORT> -cmd upconfig -
confname <SCHEMA_NAME> -confdir
SOLR_HOME\server\solr\configsets\iAutomateSolr\<CONF_FOLDER_NAME>
```

- **For iScrape and iKnowledge**: Enter the **Solr IP** and **ZooKeeper Port** that has been configured earlier. Set Schema Name as 'ticketschema' for Basic Knowledge and iScrape conf folder named as 'conf_iscrape_knowledge'.

```
e.g. for iScrape and iKnowledge –
zkcli.bat -zkhost 1x.xx.xx.x1:2181 -cmd upconfig -confname
ticketschema -confdir C:\solr\solr-
8.5.0\server\solr\configsets\iAutomateSolr\conf_iscrape_knowledge

zkcli.bat -zkhost 1x.xx.xx.x2:2181 -cmd upconfig -confname
ticketschema -confdir C:\solr\solr-
8.5.0\server\solr\configsets\iAutomateSolr\ conf_iscrape_knowledge

zkcli.bat -zkhost 1x.xx.xx.x3:2181 -cmd upconfig -confname
ticketschema -confdir C:\solr\solr-
8.5.0\server\solr\configsets\iAutomateSolr\ conf_iscrape_knowledge
```

- **For Indexer:** Enter the Solr IP and ZooKeeper Port that has been configured earlier. Set Schema Name as 'documentschema' for Advance iKnowledge conf folder named as 'conf_indexer'.

```
e.g. for Indexer –
zkcli.bat -zkhost 1x.xx.xx.x1:2181 -cmd upconfig -confname
documentschema -confdir C:\solr\solr-
8.5.0\server\solr\configsets\iAutomateSolr\conf_indexer

zkcli.bat -zkhost 1x.xx.xx.x2:2181 -cmd upconfig -confname
documentschema -confdir C:\solr\solr-
8.5.0\server\solr\configsets\iAutomateSolr\conf_indexer
```

```
zkcli.bat -zkhost 1x.xx.xx.x3:2181 -cmd upconfig -confname
documentschema -confdir C:\solr\solr-
8.5.0\server\solr\configsets\iAutomateSolr\conf_indexer
```

### 2.16.1.3.1Authentication

1. Create **security.json** file with the content mentioned in the file named **security.json**, present in the installer package under iAutomateInstaller → Resources →Resources.zip folder and store in system.

   e.g., D:\solr\solr-8.5.0\security.json.

2. Upload the **security.json** file to each of the ZooKeeper instances. Open the **Command Prompt** as **Administrator** and execute the below commands to upload configuration file to each of ZooKeeper instances:

```
solr zk cp <Security JSON PATH> zk:/security.json -z
<IP>:<ZooKeeper Port>

e.g. –
solr zk cp file:C:\solr\solr-8.5.0\security.json zk:/security.json
-z 1x.xx.xx.x1:2181
solr zk cp file:C:\solr\solr-8.5.0\security.json zk:/security.json
-z 1x.xx.xx.x2:2181
solr zk cp file:C:\solr\solr-8.5.0\security.json zk:/security.json
-z 1x.xx.xx.x3:2181
```

   This will create one user with name **Solr** and password as **SolrRocks**.

3. Execute the below command in browser to ensure that Solr is running with authentication and authorization enabled.

```
http://<IP>:<SOLRPORT>/solr/admin/authentication
http://<IP>:<SOLRPORT>/solr/admin/authorization
```

4. Enter the username '**solr'** and password '**SolrRocks'** when prompted for authentication.

   If the message **"authorization.enabled":true** is displayed, it confirms that authorization has been enabled successfully.

```
{
"responseHeader":{
"status":0,
"QTime":0},
"authorization.enabled":true,
"authorization":{
"class":"solr.RuleBasedAuthorizationPlugin",
"user-role":{"solr":"admin"},
```

```
"permissions":[{
"name":"security-edit",
"role":"admin"}]}}
```

5. If the message **"authentication.enabled":true** is displayed, it confirms that authorization has been enabled successfully.

```
{
"responseHeader":{
"status":0,
"QTime":3},
"authentication.enabled":true,
"authentication":{
"class":"solr.BasicAuthPlugin",
"credentials":{"solr":"IV0EHq1OnNrj6gvRCwvFwTrZ1+z1oBbnQdiVC3otuq0
= Ndd7LKvVBAaZIF0QAVi1ekCfAJXr1GGfLtRUXhgrF8c="}}}
```

6. Execute the below command as POST request on any of rest clients such as *Postman* or *Curl*. Select **Basic Authentication** and provide **Username** and **Password** as created in above steps under authorization tab. This creates a new user with **UserName** to be further used as **<user_name>** in credentials.

   **URL**: **Error! Hyperlink reference not valid.**.

   In Basic Authentication use the below credentials.

   - **Username**: solr
   - **Password**: SolrRocks
   - In the **Body** tab, select input as **Raw JSON** (application/json) and provide the below input.

```
{
"set-user": {"<user-name>" : "<password>" }
}

e.g. -
This will create user with username: solradmin and password:
Admin098
{
  "set-user": {"solradmin" : "Admin098"  }
}
```

Now, a Solr user has been created with **UserName** as '**solradmin**' and Password as '**Admin098**'.

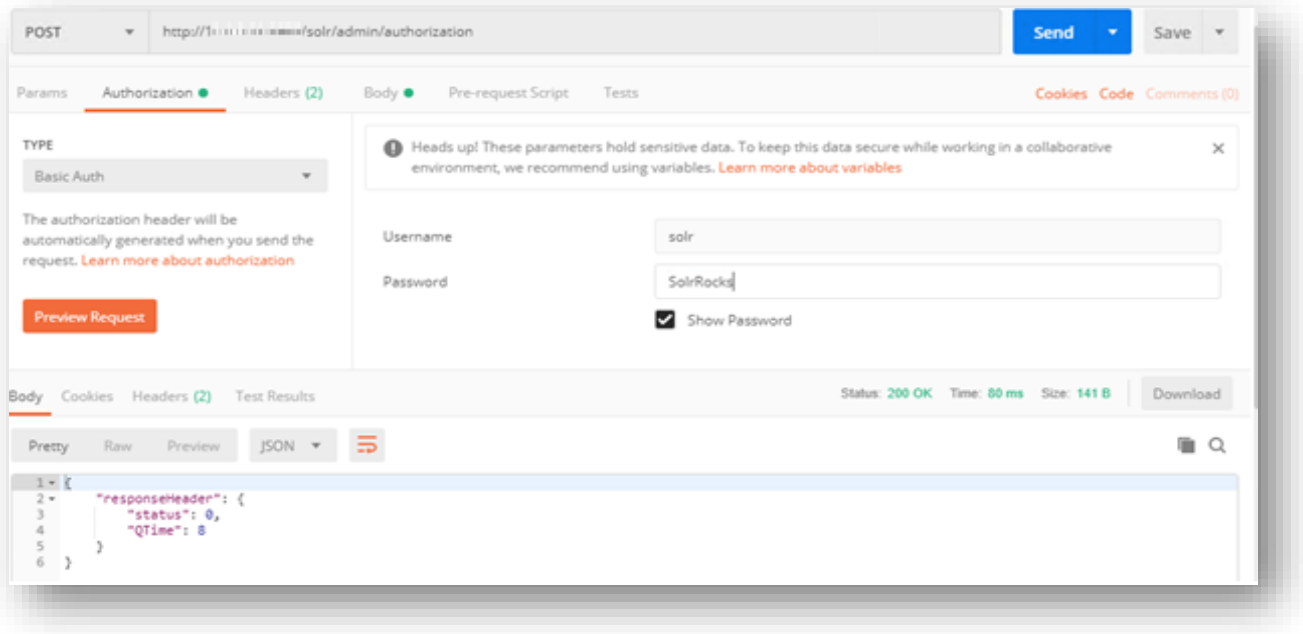


Figure 89 - Installation of SOLR (cont.)

7. This step provides admin rights to user which is mentioned in <username> tab and sets the user role using Post request with the URL specified below:

   Execute the below command as **POST** request in any of rest client such as *Postman* or *Curl*

   In Basic Authentication use the below credentials.

   - **URL**: http://<IP>:<SOLRPORT>/solr/admin/authorization
   - **Username**: solr
   - **Password**: SolrRocks
   - In the **Body** tab, select input as **Raw JSON** (application/json) and provide the below input.

```
{ "set-user-role": {"<user-name>":["admin"]}}

e.g. -
This will provide admin rights to solradmin

{ "set-user-role": {"solradmin":["admin"]}}
```

8. This step grants all permissions to the admin role as is mentioned below:

   Execute the below command as **POST** request in any of rest client such as *Postman* or *Curl.*

   Select Basic Authentication with Username as solr and Password as SolrRocks and this step will set the user permission**.**

9. Enter the respective **IP** and **Solr Port**.

**Error! Hyperlink reference not valid.**

10. In the **Body** tab, select input as **Raw JSON** (application/json) and provide the below input.

```
{
  "set-permission": { "name":"all","role": "admin"}
}
```

This grants all permissions to the users with **admin** role.

11. Open the **Command Prompt** as **Administrator** and run the below command:

```
solr stop -p <port of solr>
```

12. Go to path where Solr is installed **< SOLR_HOME >\bin.**

e.g. - C:\solr\solr-8.5.0\bin.

13. Open **solr.in** in **Edit** mode. Uncomment the two lines mentioned below and edit <user-name> and <password> as mentioned in below example:

```
REM set SOLR_AUTH_TYPE=basic
REM set SOLR_AUTHENTICATION_OPTS="-Dbasicauth=<user-
name>:<password>"

e.g. –
set SOLR_AUTH_TYPE=basic
set SOLR_AUTHENTICATION_OPTS="-Dbasicauth=solradmin:Admin098"
```

## 2.16.1.4SOLR as a Service

This section describes the procedure for enabling Solr as a service.

Please follow the below steps:

1. Download **nssm-2.24.zip** file from the path mentioned in the source field of Table 15 – Apache SOLR Requirements and unzip it.
2. Copy **nssm.exe** from **nssm-2.24\win64 to SOLR_HOME\bin**.
3. Open the Command Prompt as Administrator and Navigate to **SOLR_HOME\bin**.
4. Execute the below command:

```
nssm install solrservice
```

The following window appears:

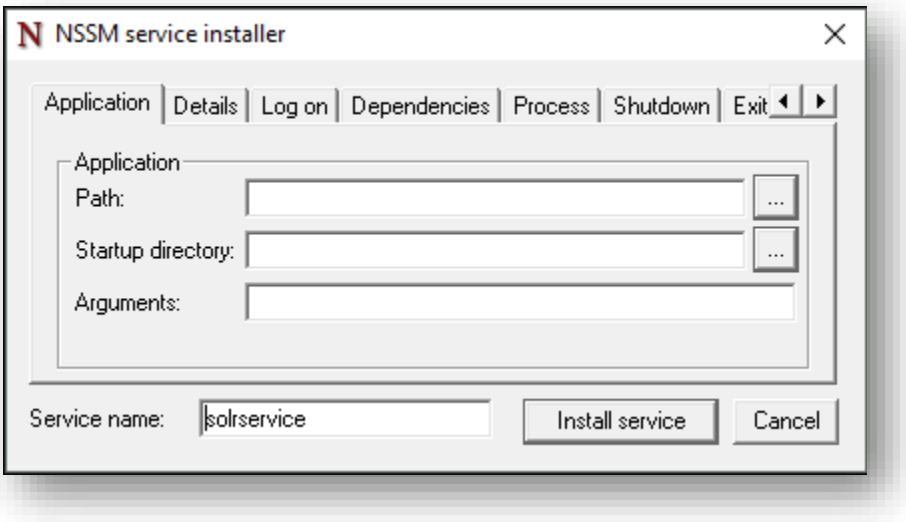


Figure 90 - Enabling Solr as Windows Service

5. Click **Application** tab and enter the information as mentioned below:
   - **Path:** C:\solr\solr-8.5.0\bin\solr.cmd
   - **Startup directory:** C:\solr-8.5.0\bin
   - **Arguments**: <As mentioned below>

```
start -cloud -s <SOLR_HOME\server\solr> -h <SOLR_IP> -f -p
<SOLR_PORT> -z <ZOOKEEPER_IP>:<ZOOKEEPER_PORT>

E.g.
start -cloud -s "C:\solr\solr-8.5.0\server\solr" -h 1x.xx.xx.x1 -f
-p 8983 -z "1x.xx.xx.x2:2181,1x.xx.xx.x3:2181,1x.xx.xx.x4:2181"
```

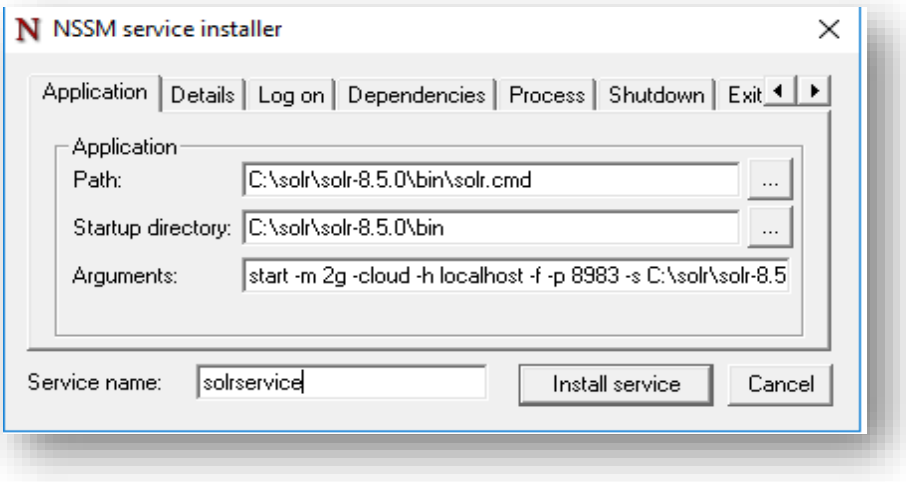


Figure 91 - Enabling Solr as Windows Service (cont.)

6. Click **Details** tab and enter the below information:

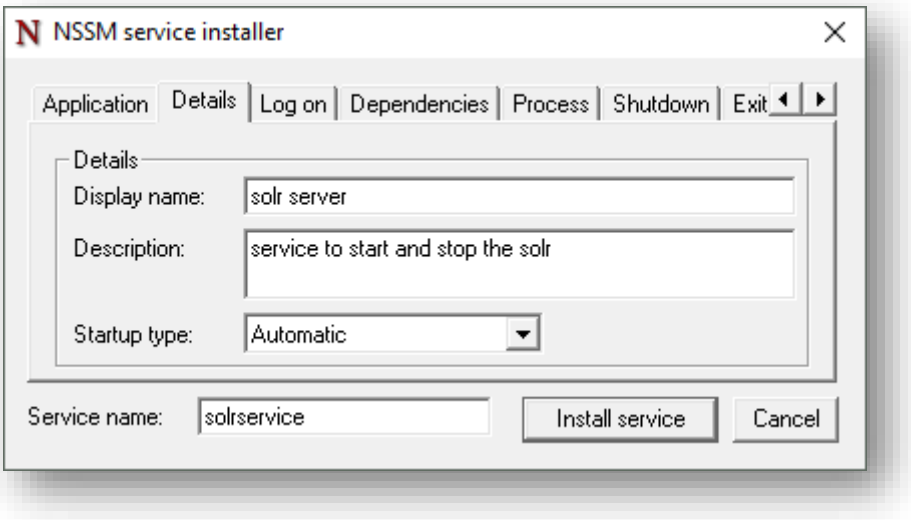


Figure 92 - Enabling Solr as Windows Service (cont.)

7. Click **Install Service**.
8. Upon successful installation, following message will appear.

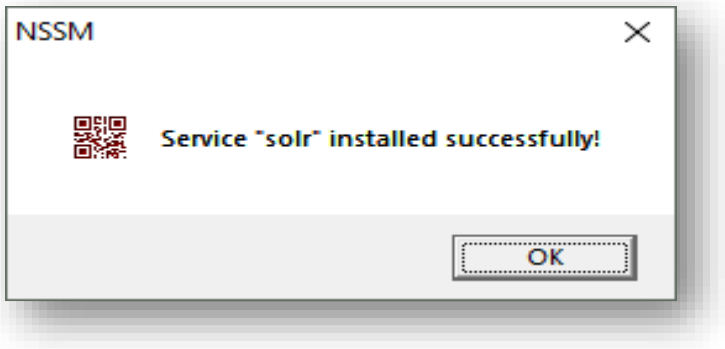


Figure 93 - Enabling Solr as Windows Service (cont.)

9. Press **Win+R**, type **services.msc** and press **Enter**.

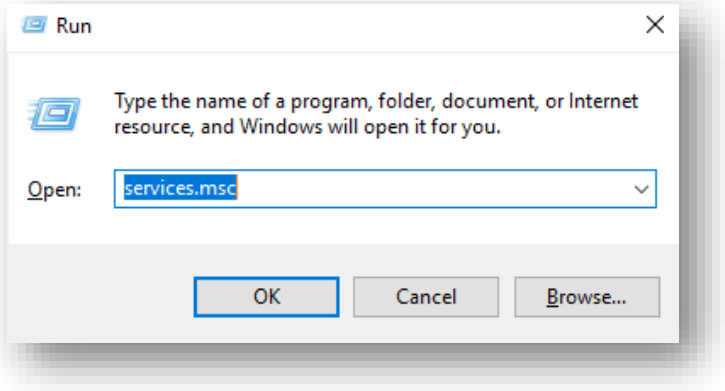


Figure 94 - Enabling Solr as Windows Service (cont.)

10. Search for **Solr Server** service.

11. Click on **Solr Server** service and then click **Start the service** on the left panel to start the service.

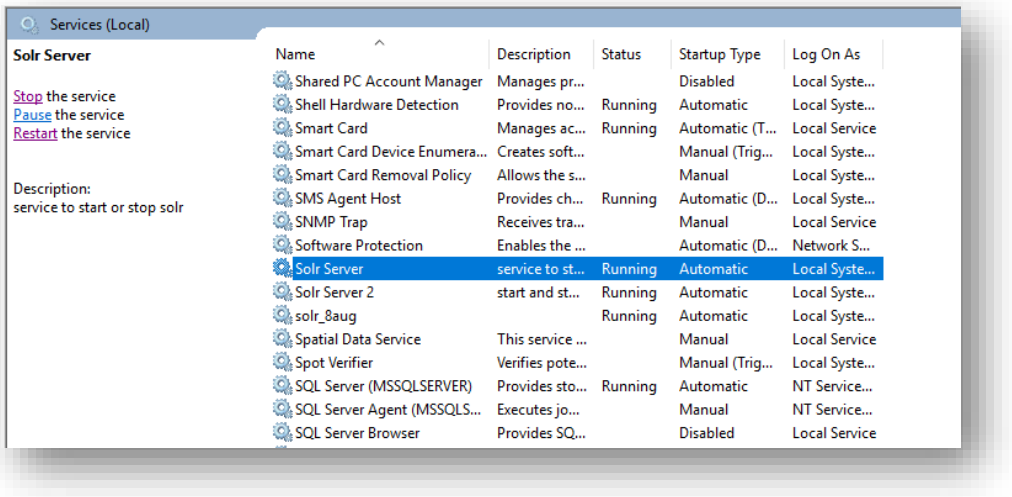


Figure 95 - Enabling Solr as Windows Service (cont.)

12. Check the below mentioned URL in browser:

    http://<SOLR IP>:<SOLRPORT>/solr

13. Enter username as **"solradmin"** and password as **"Admin098"** on Solr Portal Login Page.

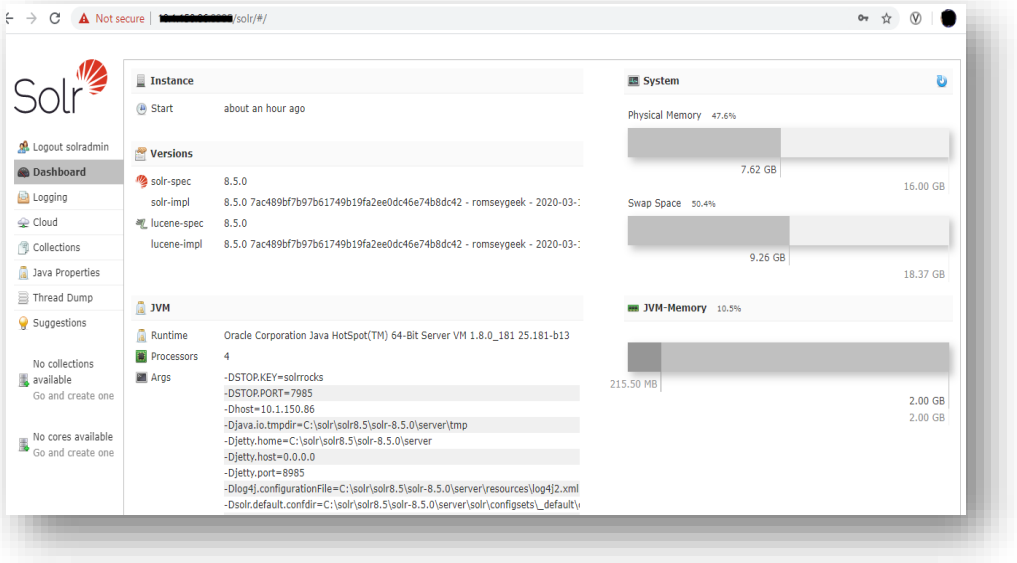


Figure 96 - Enabling Solr as Windows Service (cont.)

14. Create collection named as '**ScriptKnowledgeData'** in Solr for Basic Knowledge and iScrape using the URL below:

```
http://<SOLR_IP>:<SOLR_PORT>/solr/admin/collections?action=CREATE&name=ScriptKnowledgeData&router.name=implicit&shards=iScrape,Knowledge&replicationFactor=1&maxShardsPerNode=4&collection.configName=ticketschema&router.field=shardType.
```

15. On successful creation of the collection following response is received.

```
{
  "responseHeader":{
    "status":0,
    "QTime":3373},
  "success":{
    "<SOLR_IP>:<SOLR_PORT>_solr":{
      "responseHeader":{
        "status":0,
        "QTime":2464},
      "core":"ScriptKnowledgeData_iScrape_replica_n1"},
    "<IP>:<PORT>_solr":{
      "responseHeader":{
        "status":0,
        "QTime":2737},
      "core":"ScriptKnowledgeData_Knowledge_replica_n2"}}}
```

16. To check the Successful creation of collection in Solr. Navigate to Solr Home Page as mentioned in Figure 96. On Left Pane Select “Collections” tab and verify "ScriptKnowledgeData” collection is present.

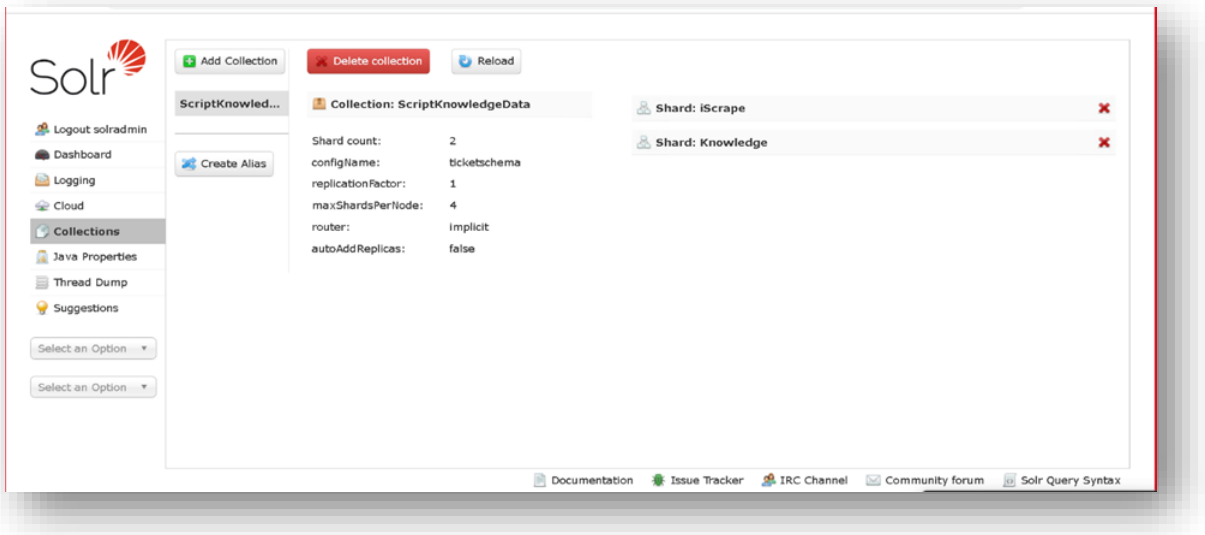


Figure 97 - Enabling Solr as Windows Service (cont.)

## 2.16.2Solr Installation – Non-High Availability (non-HA) mode

This section describes the procedure for installation of Solr without High Availability.

Please follow the below steps:

1. Download the folder **solr-8.5.0 .zip file** from the Path mentioned in source field of Table 15 – Apache SOLR Requirements.
2. Extract zip file to desired location.

   e.g.: ***D:\solr***
3. Ensure that **Java version 1.8** or higher is configured in the system and **JAVA_HOME** variable is set.

   To check the same, open the **Command Prompt as Administrator** and type the below command:

```
java -version
```

4. Proceed with the installation if the Java version is displayed. If not, please install Java as mentioned in Java.
5. Set **SOLR_HOME** environment variable and add to **PATH** environment variable. Follow the below steps to set the **SOLR_HOME** and **PATH.**
   a. Go to **Control Panel → System and Security → Advanced System Settings**.
   b. Click **Environment Variables**. A new dialog box appears.
   c. Select **Path** in the **System Variables** and add the respective **path of Solr** mentioned above.

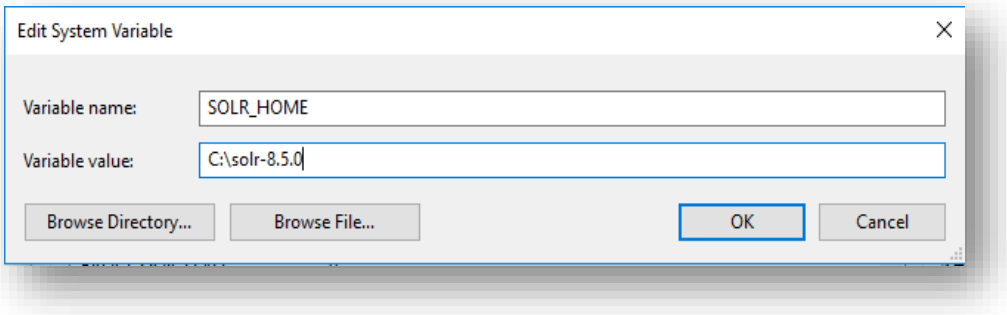


Figure 98 - Installation of SOLR without HA

   d. Set the environment variable as depicted in the image above.
   e. Add **%SOLR_HOME%\bin** to **PATH** environment variable.

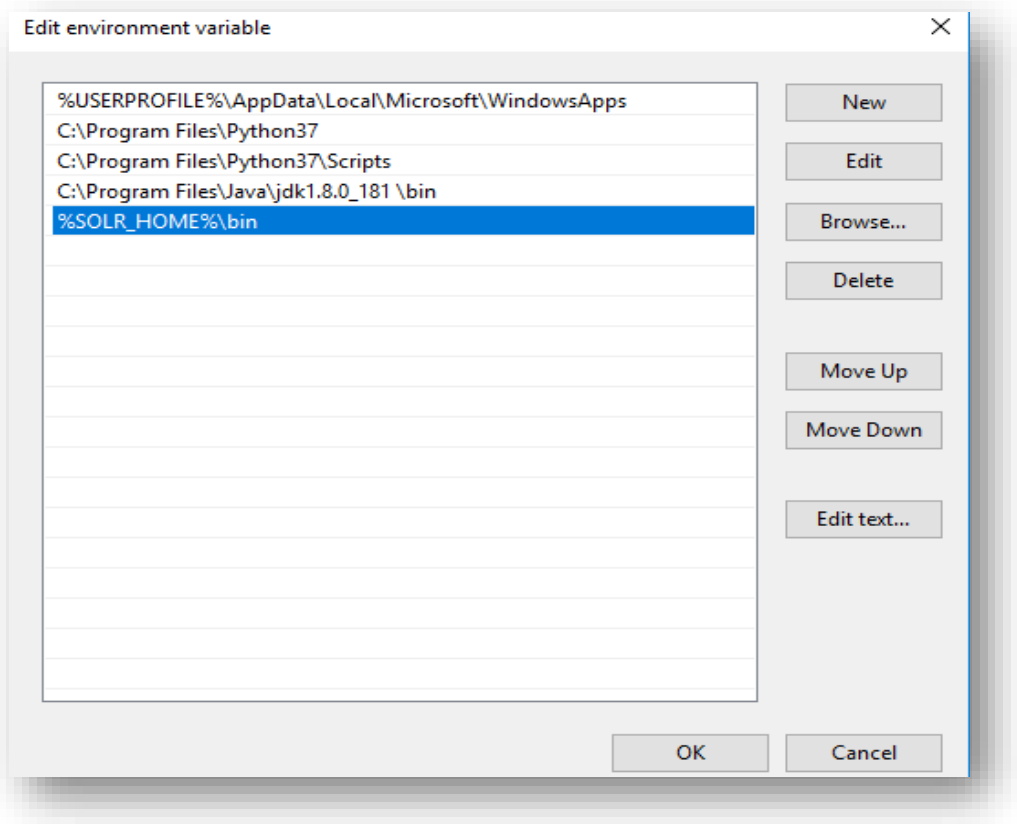


Figure 99- Installation of SOLR without HA (Cont.)

6. Navigate to **SOLR_HOME\bin.** Open the **Command Prompt** in **Administrator** mode and execute the below command:

```
solr start -m 2g -cloud -h <SOLR_IP> -p <SOLR_PORT> -s
SOLR_HOME\server\solr
```

7. Enter the **IP address** and the **Port** as the example below states in the respective fields.

```
e.g. -
solr start -m 2g -cloud -h localhost -p 8983 -s D:\solr-
8.5.0\server\solr

Here,
-p for port, you can choose another port
-h for hostname/IP
-m for memory
-s for path where solr.xml and zoo.cfg is present
SOLR_HOME is solr path till /solr-8.5.0
```

8. Create a folder named **iAutomateSolr** in the directory path **SOLR_HOME\server\solr\configsets**.

9. This step requires the two conf folders (that contains schema.xml and solrconfig.xml) from path mentioned in source field of Table 15 – Apache SOLR Requirements. Please reach out to iAuto-Product-Supp@hcl.com to get access to the folder.
10. Copy the two conf folders received to the '**iAutomateSolr'** folder created in previous steps.
11. Navigate to **SOLR_HOME\server\scripts\cloud-scripts**. Open the **Command Prompt as Administrator** mode and execute the below command for the zookeeper server, for each of the two conf folders with different schema names, respectively; to upload the config for Solr as mentioned in the following two steps:

```
zkcli.bat -zkhost <SOLR_IP>:<ZOOKEEPERPORT> -cmd upconfig -
confname <SCHEMA_NAME> -confdir
SOLR_HOME\server\solr\configsets\iAutomateSolr\<CONF_FOLDER_NAME>
```

- For **Indexer**: Enter the **ZooKeeper IP** and **ZooKeeper Port** where ZooKeeper IP is the IP address of the solr installation server and ZooKeeper Port is SolrPort+1000. Set the **schema name** as '**documentschema'** for Advance iKnowledge conf folder named as '**conf_indexer'.**

```
e.g. For Indexer-
zkcli.bat -zkhost localhost:9983 -cmd upconfig -confname
documentschema -confdir D:\solr-
8.5.0\server\solr\configsets\iAutomateSolr\conf_indexer

Here,
- zookeeperPort is (solrport+1000)
- documentschema is name of config file maintain by zookeeper
- confdir is directory where your schema.xml(edited) for Advance
iKnowledge is present
```

- For **iScrape**: Enter the **ZooKeeper IP** and **ZooKeeper Port** where ZooKeeper IP is the IP address of the solr installation server and ZooKeeper Port is SolrPort+1000. Set the **schema name** as '**ticketschema'** for BasicKnowledge and iScrape conf folder named as '**conf_iscrape_knowledge'.**

```
e.g. For iScrape: -
zkcli.bat -zkhost localhost:9983 -cmd upconfig -confname
ticketschema -confdir D:\solr-
8.5.0\server\solr\configsets\iAutomateSolr\conf_iscrape_knowledge
Here,
- zookeeperPort is (solrport+1000)
- ticketschema is name of config file maintain by zookeeper
- confdir is directory where your schema.xml(edited) is present
```

## 2.16.2.1Authentication

1. Create **security.json** file with the content mentioned in the file named **security.json**, present in the installer package under iAutomateInstaller→Resources→Resources.zip folder and store in system.

```
e.g. D:\solr\solr-8.5.0\security.json
```

2. Upload the **security.json** file to the ZooKeeper instance. Open **Command Prompt as Administrator** and execute the below command to upload configuration file to ZooKeeper:

```
solr zk cp <Security JSON PATH> zk:/security.json -z
<IP>:<ZooKeeper Port>
e.g. –
solr zk cp D:\solr-8.5.0\security.json zk:/security.json -z
1x.xx.xx.x1:9983
```

This will create one User with name solr and Password as SolrRocks

3. Execute the below command in browser to ensure that Solr is running with authentication and authorization enabled.
   - http://<IP>:<SOLRPORT>/solr/admin/authentication
   - http://<IP>:<SOLRPORT>/solr/admin/authorization
4. Enter the username **"solr"** and password **"SolrRocks"** when prompted on browser. If the message **"authorization.enabled":true** is displayed, it confirms that authorization has been enabled successfully.

```
{
"responseHeader":{
"status":0,
"QTime":0},
"authorization.enabled":true,
"authorization":{
"class":"solr.RuleBasedAuthorizationPlugin",
"user-role":{"solr":"admin"},
"permissions":[{
"name":"security-edit",
"role":"admin"}]}}
```

If the message **"authentication.enabled":true** is displayed, it confirms that authorization has been enable successfully.

```
{
"responseHeader":{
"status":0,
"QTime":3},
```

```
"authentication.enabled":true,
"authentication":{
"class":"solr.BasicAuthPlugin",
"credentials":{"solr":"IV0EHq1OnNrj6gvRCwvFwTrZ1+z1oBbnQdiVC3otuq0
= Ndd7LKvVBAaZIF0QAVi1ekCfAJXr1GGfLtRUXhgrF8c="}}}
```

5. Execute the below command as POST request on any of rest clients such as *Postman* or *Curl*. Select **Basic Authentication** and provide **Username** and **Password** as created in above steps under **Authorization tab**. This creates a new user with **UserName** to be further used as **<user_name>** in credentials.

   - http://<IP>:<SOLRPORT>/solr/admin/authentication

   In basic authentication, use below credentials:

   - **Username**: solr
   - **Password**: SolrRocks
   - In **Body** tab, select input as **Raw JSON** (application/json) and provide the below input

```
{
"set-user": {"<user-name>" : "<password>" }
}

e.g. –
This will create user with username: solradmin and password:
Admin098.

{
  "set-user": {"solradmin" : "Admin098"  }
}
```

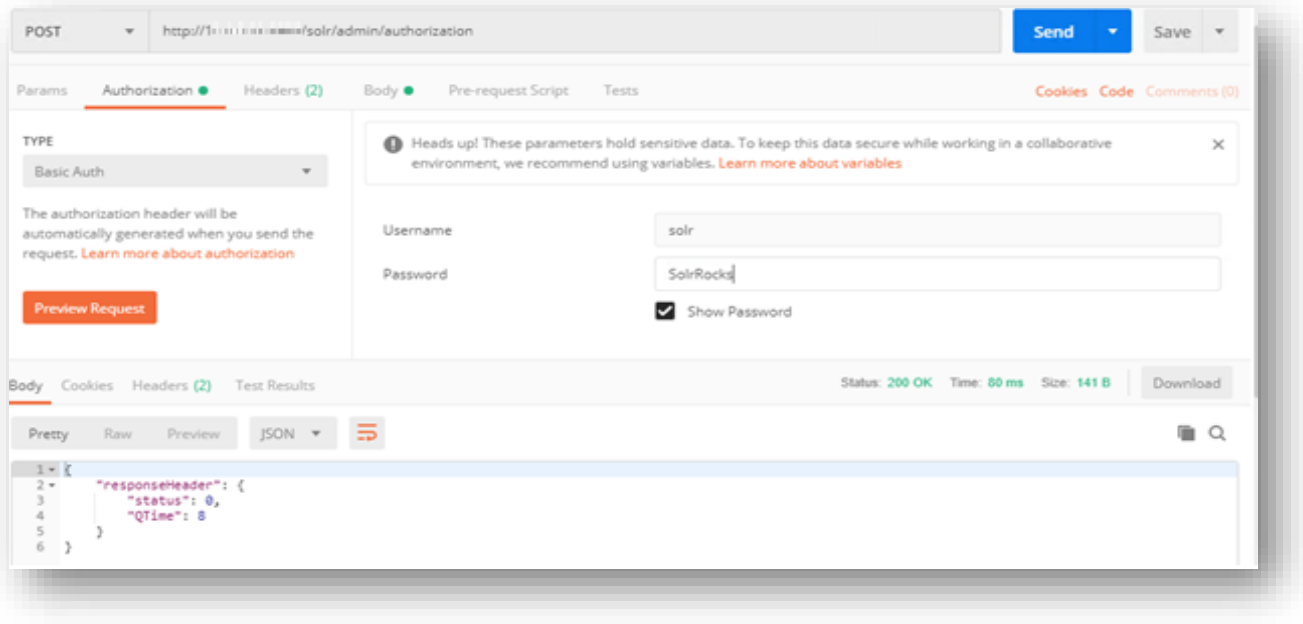


Figure 100 - Installation of SOLR (cont.)

6. Execute the below command as POST request in any of rest client such as *Postman* or *Curl* and Select **Basic Authentication** with **Username** as **solr** and **Password** as **SolrRocks** under **Authorization tab** and set the user role using Post request with the URL specified below:

   This step will provide admin rights to user which will is mentioned in <username> tab.

   - http://<IP>:<SOLRPORT>/solr/admin/authorization

7. Enter the respective **IP** and **Solr Port**.
8. In the **Body** tab, select input as raw JSON (application/json) and provide the below input.

```
{ "set-user-role": {"<user-name>":["admin"]}}
```

   e.g. – This will provide admin rights to solradmin

```
{ "set-user-role": {"solradmin":["admin"]}}
```

9. Execute the below command as POST request in any of rest client such as *Postman* or *Curl* and Select **Basic Authentication** with **Username** as **solr** and **Password** as **SolrRocks** and set the user permission**.**

   - http://<IP>:<SOLRPORT>/solr/admin/authorization

   Now, a Solr user has been created with **UserName** as '**solradmin**' and Password as '**Admin098**'.

```
{
"set-permission": { "name":"all","role": "admin"}
}
```

10. Open the **Command Prompt** as **Administrator** and run the below command:

```
solr stop -p <port of solr>
```

11. Go to path where Solr is installed **< SOLR_HOME >\bin**

    e.g. - C:\solr\solr-8.5.0\bin

12. Open **solr.in** in **Edit** mode. Uncomment the two lines mentioned below and edit them:

```
set SOLR_AUTH_TYPE=basic
set SOLR_AUTHENTICATION_OPTS="-Dbasicauth=<user-name>:<password>"
e.g. –
set SOLR_AUTH_TYPE=basic
set SOLR_AUTHENTICATION_OPTS="-Dbasicauth=solradmin:Admin098"
```

## 2.16.2.2SOLR as a Service

This section describes the procedure for enabling Solr as a service.

Please follow the below steps:

1. Download nssm-2.24.zip file from the path mentioned in the source field of Table 15 – Apache SOLR Requirements and unzip it.
2. Copy nssm.exe from nssm-2.24\win64 to SOLR_HOME\bin.
3. Go to the **SOLR_HOME\bin**. Open the Command Prompt as Administrator.
4. Execute the below command:

```
nssm install solrservice
```

5. The window shown in below image appears.

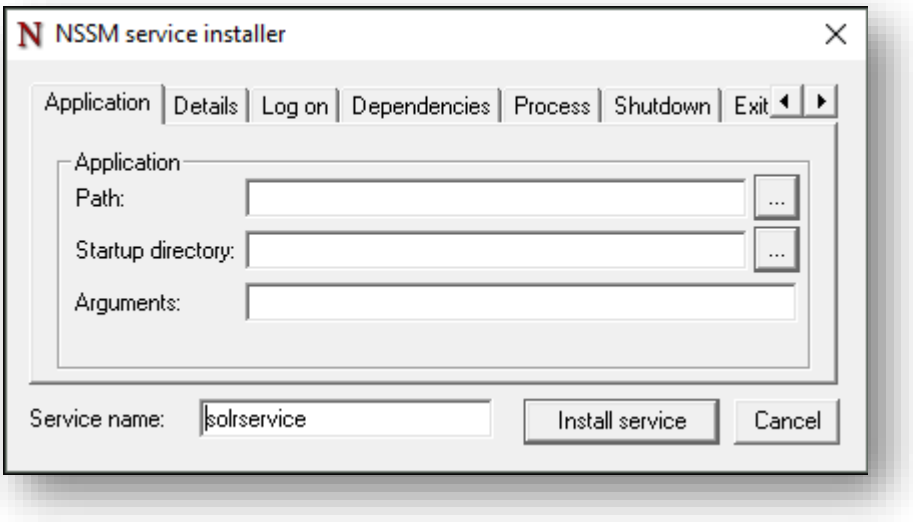


Figure 101 - Enabling Solr as Windows Service

6. Click **Application** tab and enter the information as mentioned below:
   - **Path**: C:\solr\solr-8.5.0\bin\solr.cmd
   - **Startup Directory**: C:\solr-8.5.0\bin
   - **Arguments**: <Enter values as mentioned below>

```
start -m 2g -cloud -h <SOLR_IP> -f -p <SOLR_PORT> -s
<SOLR_HOME\server\solr>
e.g.
start -m 2g -cloud -h localhost -f -p 8983 -s C:\solr\solr-
8.5.0\server\solr
```

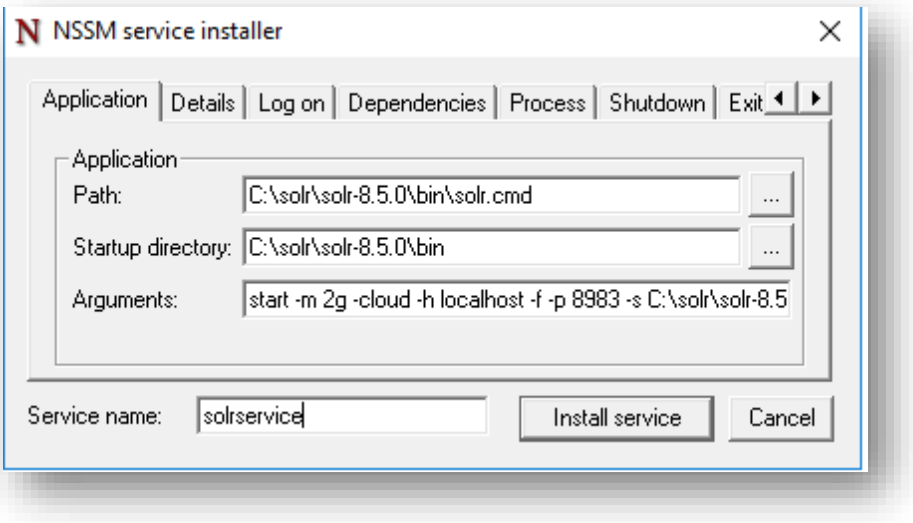


Figure 102 - Enabling Solr as Windows Service (cont.)

7. Click the **Details** tab and enter the information as displayed in the below image:

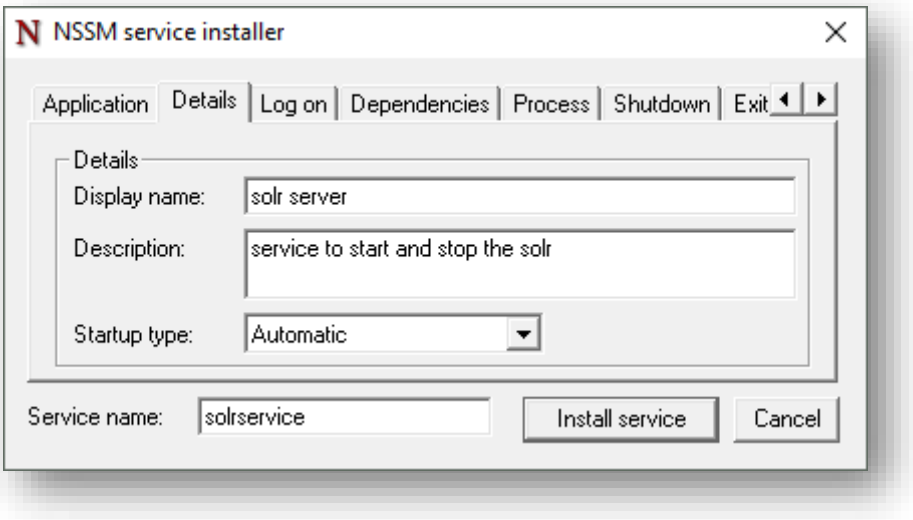


Figure 103 - Enabling Solr as Windows Service (cont.)

8. Click **Install service**.
9. Upon successful installation, the following message will appear.

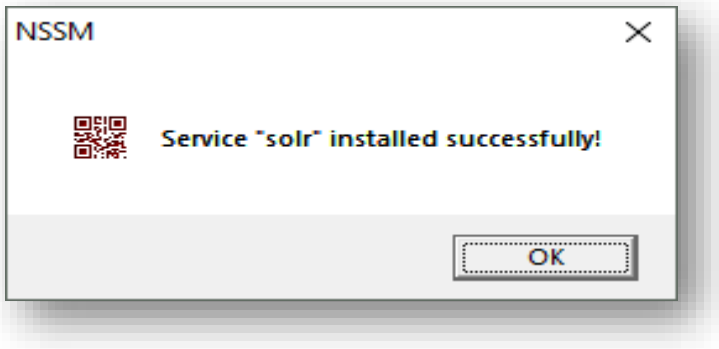


Figure 104 - Enabling Solr as Windows Service (cont.)

10. Press **Win+R**, type **services.msc** and press **Enter**.

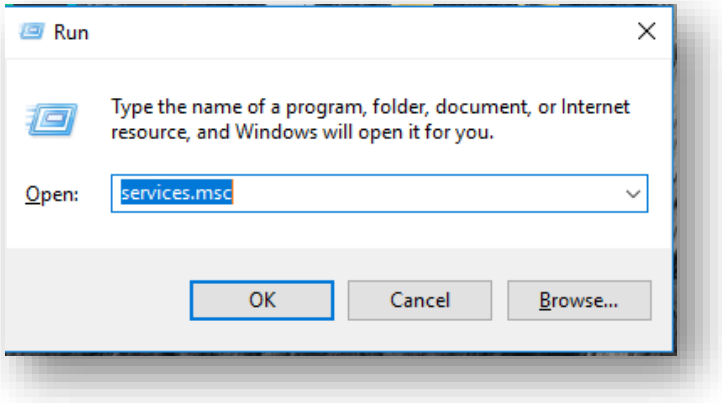


Figure 105 - Enabling Solr as Windows Service (cont.)

11. Search for **Solr Server** service and click on it.

12. Click **Start the service** on the left panel to start the service.

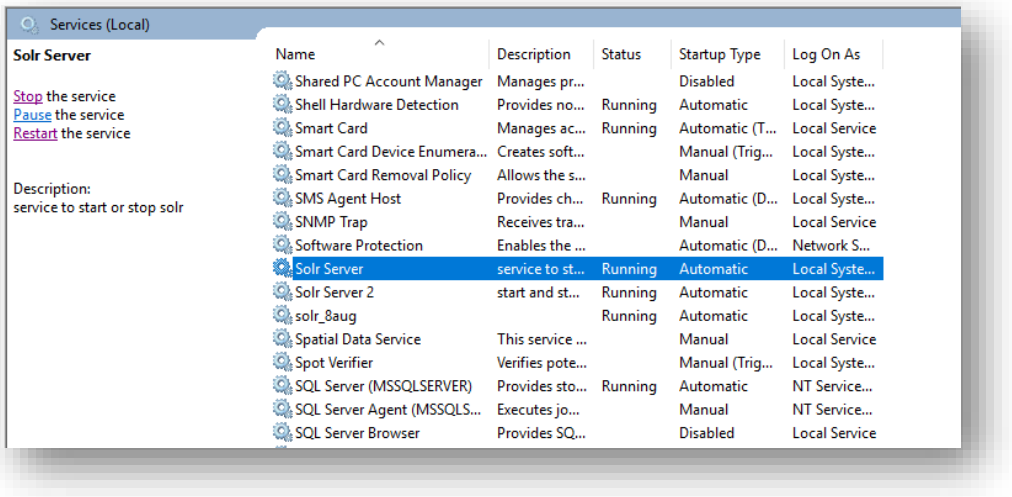


Figure 106 - Enabling Solr as Windows Service (cont.)

13. Check in browser, if Solr is properly configured.

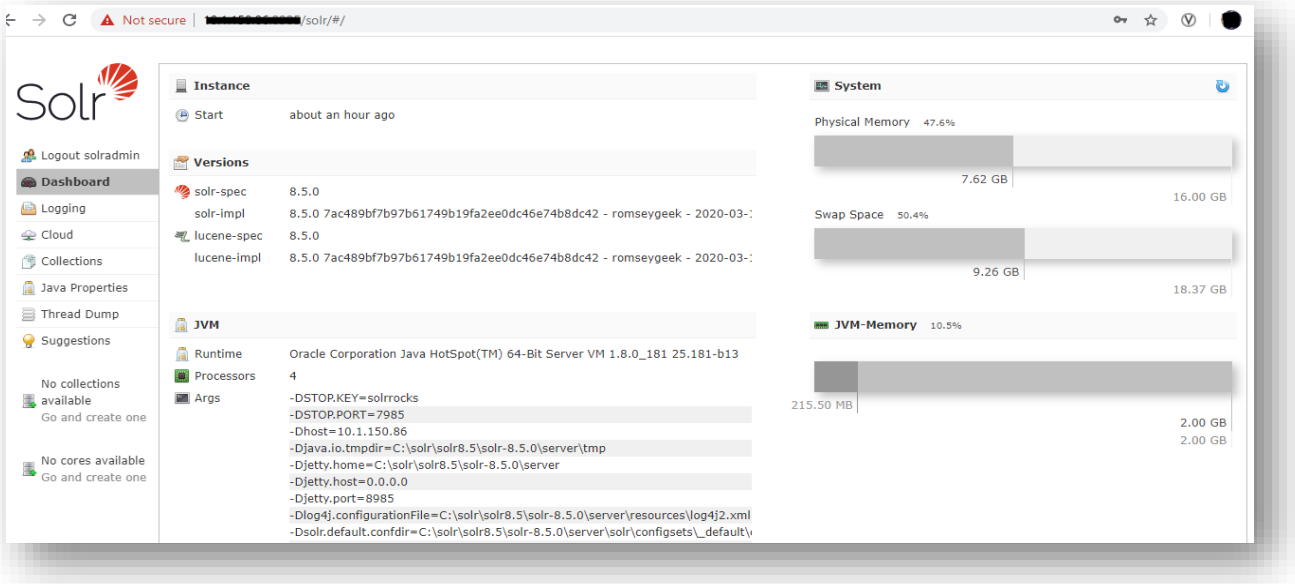


Figure 107 - Enabling Solr as Windows Service (cont.)

14. Create collection named as '**ScriptKnowledgeData'** in Solr for Basic Knowledge and iScrape using the below url:

```
http://<SOLR_IP>:<SOLR_PORT>/solr/admin/collections?action=CREATE&name=ScriptKnowledgeData&router.name=implicit&shards=iScrape,Knowledge&replicationFactor=1&maxShardsPerNode=4&collection.configName=ticketschema&router.field=shardType
```

15. On successful creation of the collection, the following response is received:

```
{
```

```
  "responseHeader":{
    "status":0,
    "QTime":3373},
  "success":{
    "<SOLR_IP>:<SOLR_PORT>_solr":{
      "responseHeader":{
        "status":0,
        "QTime":2464},
      "core":"ScriptKnowledgeData_iScrape_replica_n1"},
    "<IP>:<PORT>_solr":{
      "responseHeader":{
        "status":0,
        "QTime":2737},
      "core":"ScriptKnowledgeData_Knowledge_replica_n2"}}}
```


# 2.17Certificates

Table 17 – Certificate Requirements

| | |
|---|---|
| Purpose | Install certificate for communication |
| Source | Available as a part of iAutomate installer package. Follow the path below:<br><br>Pre-requisite → Python certificate.zip |

## 2.17.1Installation Process

1. Download the file Python certificate.zip from the Path mentioned in the above section. Copy the extracted contents from the zip file and copy it to "*C: \Programfiles\certificate*" folder.

Create folder if not available.

# 2.18DLL Configuration for IRecommend:

Table 18 - DLL Configuration for iRecommend multi-process

| | |
|---|---|
| Version | As per DLL versions released by BigFix Runbook AI team. |
| Purpose | This configuration is required to run iRecommend module in multi-process mode. |
| Source | DLLs are available as part of BigFix Runbook AI installer package.<br>Pre-Requisite Software → Newtonsoft.Json.Dll<br>Pre-Requisite Software → HCL.iAutomate.EncryptDecrypt.Dll |

1. Make sure to add downloaded DLLs files in the path **<pythonpath>\Lib\site-packages**.
   - HCL.iAutomate.EncryptDecrypt.dll
   - Newtonsoft.Json.dll

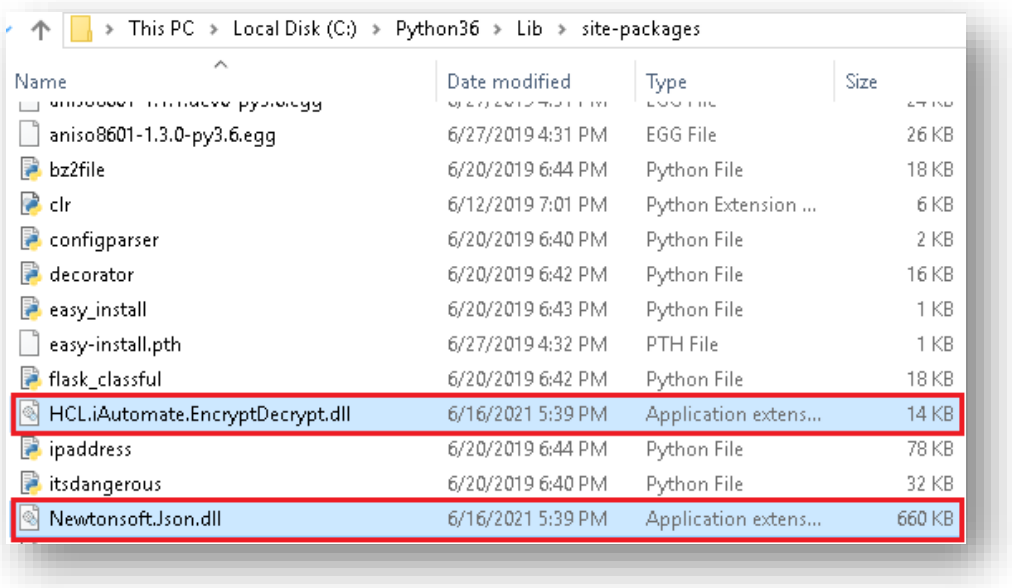


Figure 117 - Screenshot of the DLL Configuration

2. Now Start/Restart iRecommend service as per the steps defined earlier.