Stanbic IBTC Bank Plc

MongoDB Consulting Report

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Participants:

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This document summarizes the discussions and recommendations from 2 days of “Optimize, Accelerate” remote consultation with “Stanbic IBTC Bank Plc” on 14-September-2023 and 15-September-2023.

Each recommendation is assigned a level from 1 to 3. The levels correspond to the following priorities:

1. Implement this recommendation *immediately*.

    Not implementing this recommendation incurs the risk of data loss, system unavailability, or other significant problems that may cause outages in the future.

2. Implement this recommendation *as soon as possible*.

    These recommendations are less severe than level 1, but typically represent significant problems that could affect a production system. Consider these issues promptly.

3. Consider this recommendation.

    While this suggestion may improve some aspects of the application, it is not critical and may reflect a much larger change in the application code or MongoDB deployment. Consider these modifications as part of the next revision of the application.

1. Background

1.1 Application

Stanbic IBTC is a financial service holding company in Nigeria with subsidiaries in Banking, Stock Brokerage, Investment Advisory, Asset Management, Investor Services, Pension Management, Trustees Insurance Brokerage and life Insurance businesses.

1.2 Environment

Application is developed using C#. Following are the details of the MongoDB deployment focussed as part of this engagement:

Mongodb Deployment

Server	IP Address	Notes
pngmobiledb01v.ng.sbicdirectory.com	10.234.18.142	Deployment (Region 1)
pngmobiledb02v.ng.sbicdirectory.com	10.234.18.143	Deployment (Region 1)
pngarbiter.ng.sbicdirectory.com	10.234.18.141	Deployment (Region 1)
yngmobiledb01v.ng.sbicdirectory.com	10.234.179.212	Deployment DR (Region 2)
yngmobiledb02v.ng.sbicdirectory.com	10.234.179.213	Deployment DR (Region 2)

Ops manager App DB

Server	IP Address	Notes
pngmondbops01.ng.sbicdirectory.com	10.234.19.125	Application Server (Region 1)
pngmondbops02.ng.sbicdirectory.com	10.234.19.126	MongoDB Prod (Region 1)
yngmondbops01.ng.sbicdirectory.com	10.234.178.54	MongoDB DR (Region 2)
yngmondbops02.ng.sbicdirectory.com	10.234.178.55	MongoDB DR (Region 1)

2. Goals of the Consulting Engagement

The primary goal of the engagement was to discuss the upgrade path for the ops manager. Various topics discussed are as follows:

- Upgrade Ops Manager
- Paginations

3. Recommendations

3.1 Upgrading OpsManager [Priority 1]

The team is currently using ops manager 5.0.9 with a single node ops manager, during the consultation, we discussed the plan to upgrade the ops manager

We need to upgrade the ops manager to the latest subversion version of 5 which is 5.0.22 and then upgrade to the later version of ops manager

```
5.0.9 → 5.0.22 → 6.0.18
```

3.1.1 Application Database and Backup Database Compatibility

The team has currently installed the application database and backup database with mongodb version 5.0.8-ent, the minimal supported version for ops manager 6.0 is mongodb version 5.0

For more information [please refer here]

3.1.2 Operating Systems Compatible with the MongoDB Agent

Hosts that run MongoDB Agents must run on a 64-bit version of one of the following hardware architectures and operating systems.

Current team OS

```
NAME="Red Hat Enterprise Linux Server"
VERSION="7.9 (Maipo)"
ID="rhel"
ID_LIKE="fedora"
VARIANT="Server"
VARIANT_ID="server"
VERSION_ID="7.9"
PRETTY_NAME=RHEL
ANSI_COLOR="0;31"
CPE_NAME="cpe:/o:redhat:enterprise_linux:7.9:GA:server"
HOME_URL="https://www.redhat.com/"
BUG_REPORT_URL="https://bugzilla.redhat.com/"

REDHAT_BUGZILLA_PRODUCT="Red Hat Enterprise Linux 7"
REDHAT_BUGZILLA_PRODUCT_VERSION=7.9
REDHAT_SUPPORT_PRODUCT="Red Hat Enterprise Linux"
REDHAT_SUPPORT_PRODUCT_VERSION="7.9"
```

Mongodb Agent Compatibility

Architecture	Distro/OS	6.0	5.0	4.4	4.2	4.0	3.6
x86_64	RHEL/Centos 7	✓	✓	✓	✓	✓	✓
	RHEL/Centos/Rocky/Alma 8 [1]	✓	✓	✓	✓	✓	✓
	Amazon Linux 2	✓	✓	✓	✓	✓	✓
	SUSE12	✓	✓	✓	✓	✓	✓
	SUSE15	✓	✓	✓	✓		
	Debian 8 [2]					✓	✓
	Debian 9 [2]		✓	✓	✓	✓	✓
	Debian 10 [2]	✓	✓	✓	✓		
	Debian 11 [2]	✓	✓				
	Ubuntu 16.x			✓	✓	✓	✓
	Ubuntu 18.x	✓	✓	✓	✓	✓	✓
	Ubuntu 20.x	✓	✓	✓			
	Ubuntu 22.x [3]	✓					
	Windows	✓	✓	✓	✓	✓	✓

3.1.3 Backup Configuration and App DB data before Upgrade

Before proceeding with the upgrading of the Ops Manager instance, To maintain existing settings and availability, back up the following in your current Ops Manager instance:

1. Copy **conf-mms.properties** to a secure location. The conf-mms.properties store's settings for the Ops Manager instance.

```
Unset
mkdir /backup
sudo cp /opt/mongodb/mms/conf/conf-mms.properties /backup
```

```
[root@ip-172-31-15-105 ~]# mkdir /backup
[root@ip-172-31-15-105 ~]# sudo cp /opt/mongodb/mms/conf/conf-mms.properties /backup
[root@ip-172-31-15-105 ~]# cd /backup/
[root@ip-172-31-15-105 backup]# ls
conf-mms.properties
[root@ip-172-31-15-105 backup]#
```

2. The gen.key provides details to encrypt and decrypt Ops Managers backing databases and user credentials. Ops Manager might delete these files as part of the upgrade process.

   Path of gen.key:

   > For RPM or Ubuntu Installations: **/etc/mongodb-mms/**
   >
   > For rpm/.tar Installations : **${HOME}/.mongodb-mms/** OR **/etc/mongodb-mms/gen.key**

Run the below command to copy the gen file. Change the gen.key path as per your OS installation type.

```
Unset
sudo cp /etc/mongodb-mms/gen.key /backup
sudo cat /etc/mongodb-mms/gen.key | base64 | sudo tee
/backup/gen_backup_base64.txt
```

```
[root@ip-172-31-15-105 backup]# sudo cp /etc/mongodb-mms/gen.key /backup
[root@ip-172-31-15-105 backup]# ls
conf-mms.properties  gen.key
[root@ip-172-31-15-105 backup]# sudo cat /etc/mongodb-mms/gen.key | base64 | sudo tee /
klE2VRh4DGKGKIB6jgjwV93LqEDz2y7o
[root@ip-172-31-15-105 backup]#
```

3. Take a backup of Application Database data using mongodump. This will be needed If the upgrade fails, you need a current backup to restore your Ops Manager instance.

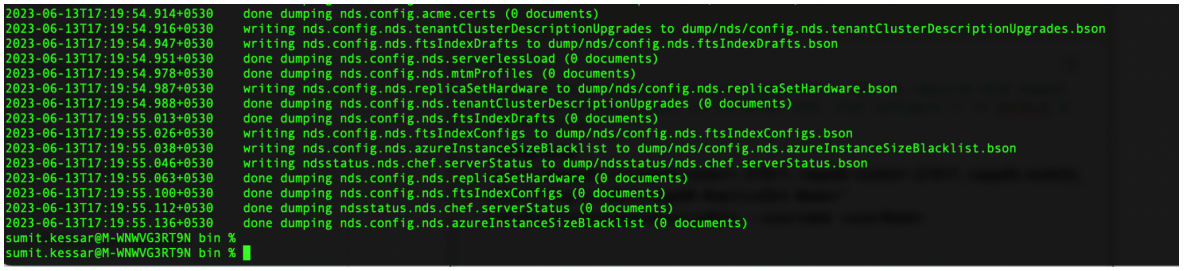
For installation of mongodump refer to [Installation Guide.]

The below command can be used to dump the application DB database.

```
/*Run the below command on a server ensuring it has the required disk needed for backup and can connect to the APPDB node, else configure it in network or security group*/

//Please ensure to store the backup in a safe location

./mongodump --uri="mongodb://<appdb-node1>:27017,<appdb-node2>:27017,<appdb-node3>:27017/?replicaSet=<appDB-ReplicaSet-Name>"  --authenticationDatabase=admin --username <userName>
```



4. On the Ops Manager host that you're upgrading, back up your existing configuration files and logs to a directory other than the install directory.

```
cp -a <install_dir>/conf ~/mms_conf.backup
cp -a <install_dir>/logs ~/mms_logs.backup
```

The default installation directory is often **/opt/mongodb/mms**

```
[root@ip-172-31-15-105 ~]#
[root@ip-172-31-15-105 ~]# cp -a /opt/mongodb/mms/conf ~/mms_conf.backup
[root@ip-172-31-15-105 ~]# cp -a /opt/mongodb/mms/logs ~/mms_logs.backup
[root@ip-172-31-15-105 ~]#
[root@ip-172-31-15-105 ~]# ls
mms_conf.backup  mms_logs.backup  mongodb-mms-5.0.22.100.20230726T1548Z-1.x86_64.rpm
[root@ip-172-31-15-105 ~]#
```

Please Note: Step 4 is optional and can lead to higher disk utilizations

3.1.4 Stop ALL instances of the backup daemon

On all servers where the backup daemon is running

```
sudo service mongodb-mms-backup-daemon stop
```

We can verify if the backup demon is stopped

```
ps -ef | grep mongodb-mms-backup-daemon
```

If the Backup Daemon continues to run, issue this command:

```
sudo /etc/init.d/mongodb-mms-backup-daemon stop
```

Repeat step 1 with every other Backup Daemon host.

3.1.5. Download Ops Manager Packages

To download using the package manager for your OS, please refer to the MongoDB Download Center page:
https://www.mongodb.com/try/download/ops-manager or **refer to the https link** using https://www.mongodb.com/subscription/downloads/archived

Open your preferred browser to visit the **MongoDB Download Center** on MongoDB.com.
If you start from MongoDB.com, click **Products** > **Ops Manager** > **Try it now**.

a. Select your OS platform from the **Platforms** drop-down menu
b. From the **Packages** drop-down menu, select the needed package.
c. Click **Download**.

Another way is to start downloading the package if you have Internet access in OS using the **https link** for your respective from https://www.mongodb.com/subscription/downloads/archived

```
sudo curl -OL
https://downloads.mongodb.com/on-prem-mms/rpm/mongodb-mms-6.0.17.100.20230801T13
50Z.x86_64.rpm?_ga=2.173233377.373185836.1692108905-902367657.1652524631&_gac=1.
221793002.1692108905.CjwKCAjwxOymBhAFEiwAnodBLC7NKuOMZ-rgm4cwr57nm-ShILPyiNEIY2e
PDzRzoTtkcaoir2QzpBoCisIQAvD_BwE
```

3.1.6 Stop the Ops Manager Service on one node

Stop the ops manager instance.

```
sudo service mongodb-mms stop
```

3.1.7 Install the Ops Manager package on the Ops Manager host that you are upgrading.

To install the .rpm package on the upgraded Ops Manager host, issue the following command. This replaces the appropriate binary of ops manager on the host system

```
sudo rpm -Uvh mongodb-mms-<version>.x86_64.rpm
```

3.1.8 Start Ops Manager on the upgraded host.

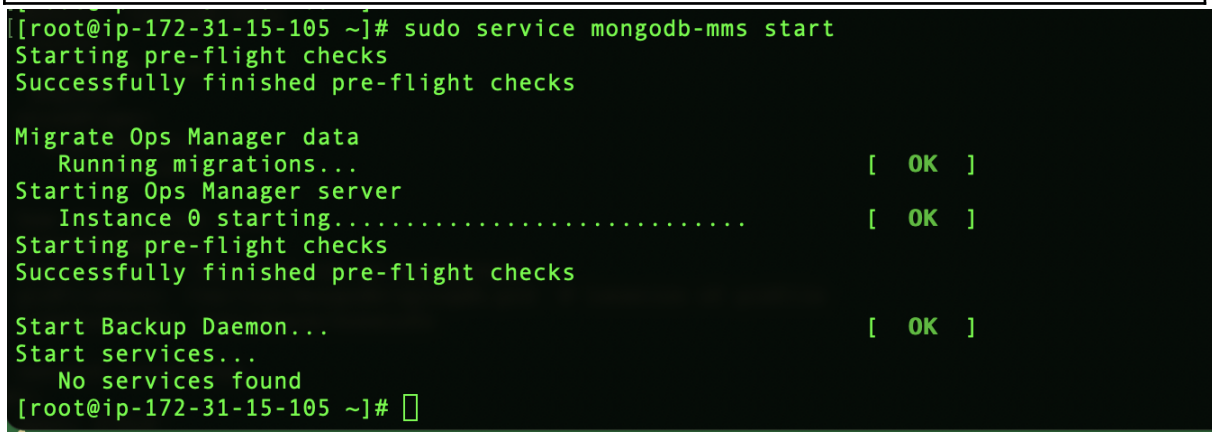
On RHEL, CentOS, and SUSE12 hosts that use systemd, issue the following command: sudo service mongodb-mms start

```
sudo service mongodb-mms start
```

During the restart process the upgraded Ops Manager will perform database migration and then pause waiting for the remaining nodes to be upgraded:

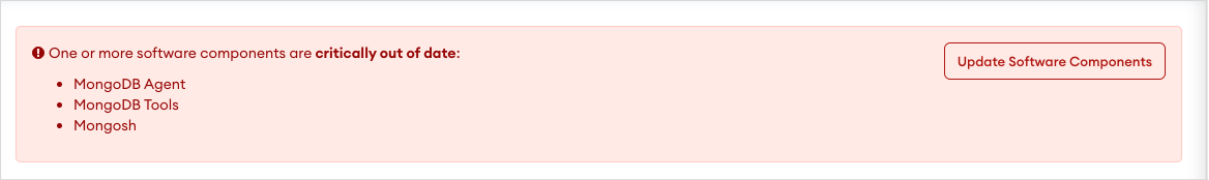
```
$ sudo service mongodb-mms start
Starting pre-flight checks
Successfully finished pre-flight checks

Migrate Ops Manager data
  Running migrations...                    [ OK ]
Starting Ops Manager server
  Instance 0 starting.....                 [ OK ]
Starting pre-flight checks
```



3.1.9 Update all the agents

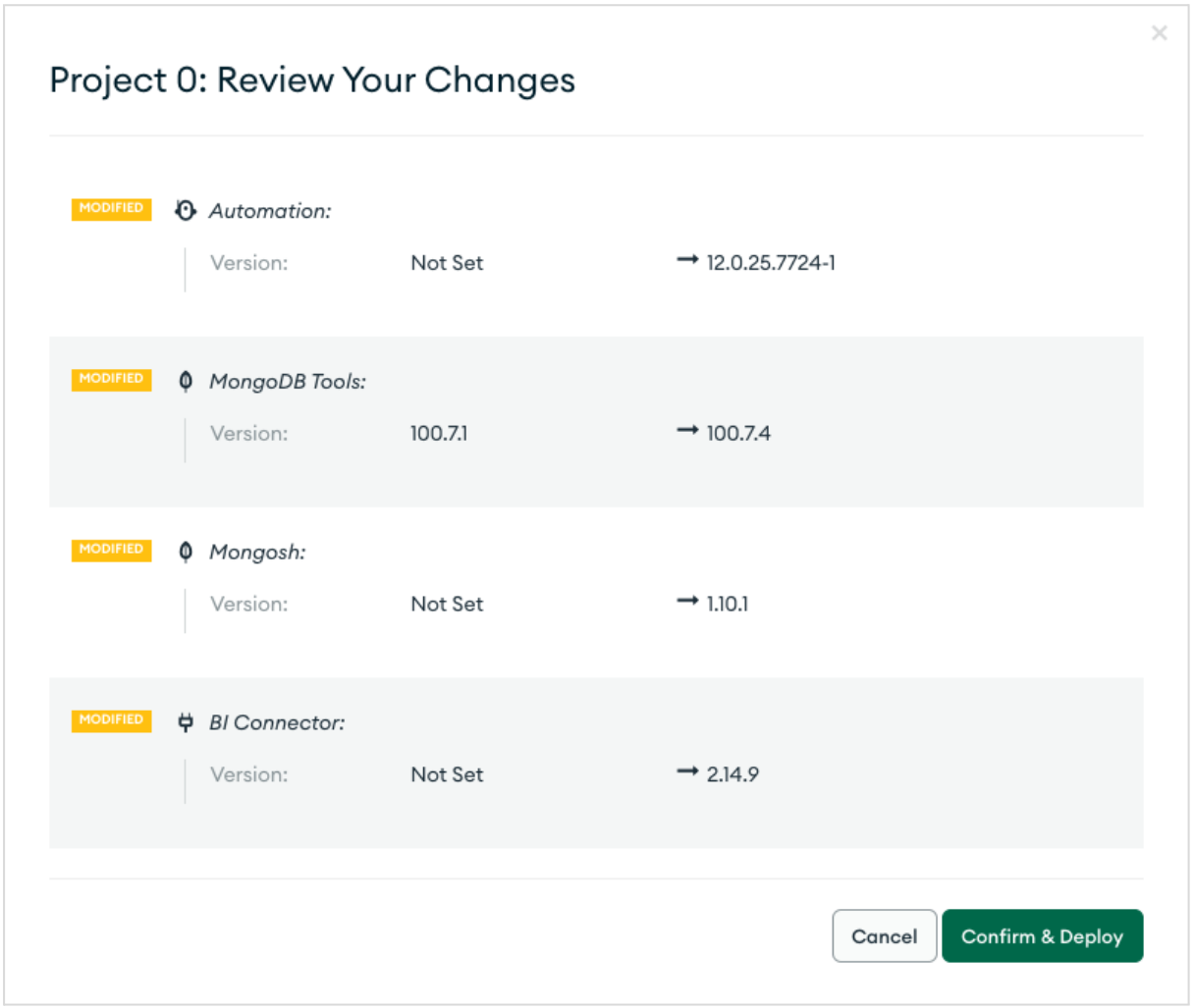
Once the upgraded Ops manager is running you will be presented with a warning banner:

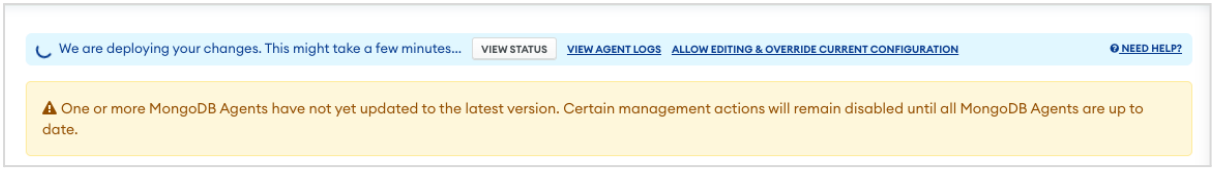


Click on the "**Update Software Components**" box to initiate an **update of all agents**.

Then click "**Review and Deploy**:

And confirm the changes:





Please Note: The team must test these steps in a lower environment before running on the production instance.

4. Other Notes, Questions & Answers

4.1 Highly Available Ops Manager Application

The Ops Manager is currently installed on a single host only. This means that if this host goes down, we won't be able to access the Ops Manager application, even though the backing databases are deployed as replica sets (thus highly available).

The Ops Manager Application provides high availability through the use of multiple Ops Manager Application servers behind a load balancer and through use of a replica set to host the Ops Manager Application Database.

To configure high availability for Ops Manager, we need to install the Ops Manager application on a second host (in the team's case: *prod-<HOSTNAME-2>.com*) and connect it to the Application Database. We then configure a Load Balancer to balance between the pool of Ops Manager Application hosts. The requirements for the Load Balancer are as follows:

- No need for persistent/sticky connections: The Ops Manager Application's components are stateless between requests. Any Ops Manager Application server can handle requests as long as all the servers read from the same Ops Manager Application Database.
- Client timeouts should be set to 600 seconds.
- Configured with the Round Robin Algorithm (or any algorithm that doesn't prefer a single host).
- Must support Layer 7 (the Application Layer) of the OSI model.
- Must not return cached content

Please note: Configuring high availability ops manager is detailed in a previous report named 2022-05 -16 - Stanbic IBTC Bank Plc - Operate - Ignite

For more information Please refer to this.

4.1.1 Upgrading HA Ops Manager

If you have an Ops Manager installation with more than one Ops Manager host pointing to the same Application Database, you can upgrade Ops Manager to a newer version without incurring monitoring downtime. After you complete the upgrade of one Ops Manager host of a highly available Ops Manager deployment, that deployment enters a state known as **Upgrade Mode**. In this state, the Ops Manager is available during an upgrade. The benefits of this mode are that throughout the upgrade process:

- Alerts and monitoring operate
- Ops Manager instances remain live
- Ops Manager Application may be accessed in read-only mode
- Ops Manager APIs that write or delete data are disabled

Your Ops Manager instance stays in **Upgrade Mode** until all Ops Manager hosts have been upgraded and restarted. You should not upgrade more than one Ops Manager host at a time.

For more information please refer here

5. Questions

5.1 How to downgrade Ops Manager?

There are no supported downgrade paths for the Ops Manager.

5.2 Can you point opsmanager 6.0.x to the application db created for 5.0.9?

It is recommended to upgrade the ops manager using the ops manager upgrade path going from 5.0.9 to 5.0.22 and then to 6.0.18.

6. Recommended Further Consulting and Training

MongoDB offers a comprehensive set of instructor-led training courses covering all aspects of building and running applications with MongoDB. Instructor-led training is the fastest and best way to learn MongoDB in depth. Both public and private training classes are available - for more information or to enroll in classes, please see Instructor-Led Training.