MongoDB Management Pain Relief

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Goals

- **Ops Manager, Cloud Manager, Atlas**
  - What are they?
  - How do they differ?
  - Why do I need them?
- **Ansible**
  - What is it and how can I use these tools to **relieve some pain in my life**?

Show of Hands

- **Who's Here?**
  - DevOps/Ops?
  - Site Reliability?
  - Engineer?
  - DBA?
  - Developer?

Admin Evolution

1. Manual

Download by hand, build server from CD, Manually Start and Config Services.

2. Scripting

Write scripts to maintain configurations, copy those to servers and run them.

3. Puppet, Salt, **Ansible**

Leveraging automated solution for config mgt, some cloud deployment.

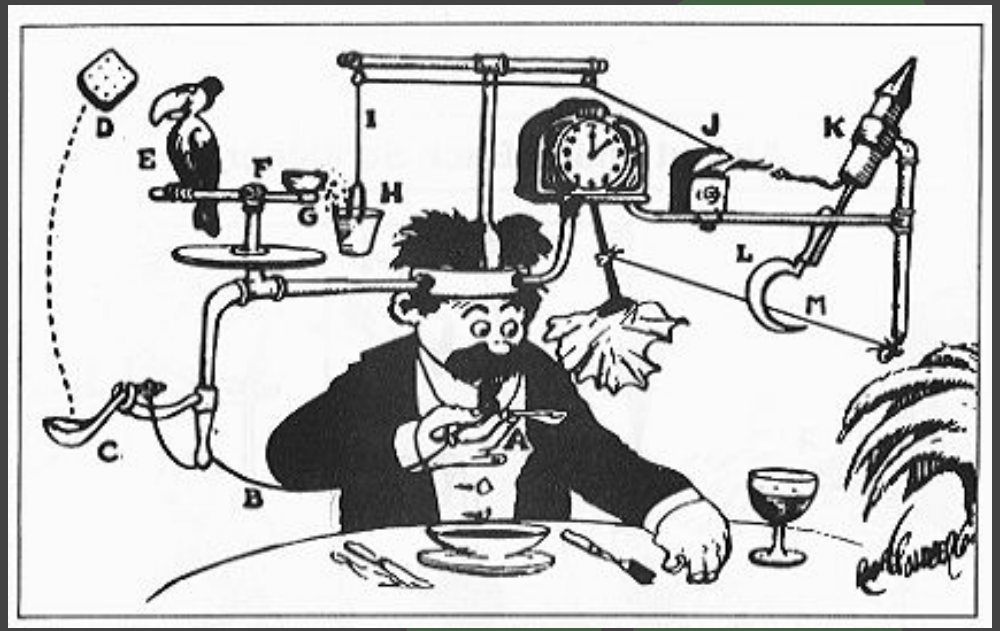
4. Cloud/Hybrid Automation

Full Cloud-based pro-visioning and management

mongoDB

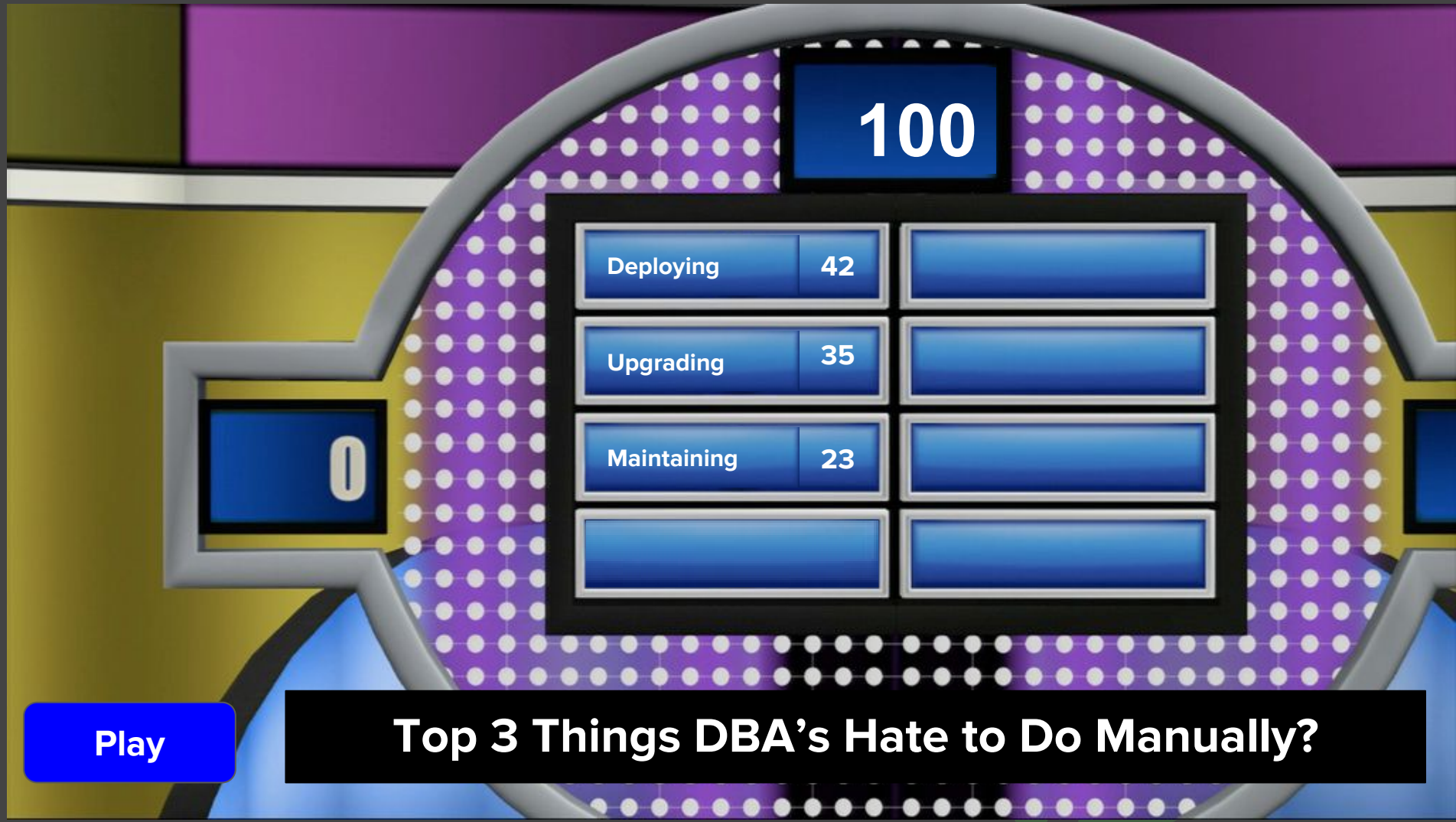
Managing databases manually can be...

- **Painful**
- Risky
- Complex
- Susceptible to human error*
- Unnecessary...



* 80% of all downtime due to people/process error (Gartner)

mongoDB


100
Deploying 42
Upgrading 35
Maintaining 23
0
Play
Top 3 Things DBA's Hate to Do Manually?

What it Takes – 12-Server System

It can take **a lot** of manual effort to care for a MongoDB system in production

- **Install + Configure**
  - **150**+ steps
- **Upgrades, downgrades**
  - **100**+ steps
- **Scale out, move servers, resize oplog, etc**
  - **10 - 180**+ steps

Up to 95% Reduction in Operational Overhead

mongoDB

MongoDB Ops Manager

The Best Way to Manage MongoDB In Your Data Center

Up to 95% Reduction in Operational Overhead

Single-click provisioning, scaling & upgrades, admin tasks

Monitoring, with charts, dashboards and alerts on 100+ metrics

Backup and restore, with point-in-time recovery, support for sharded clusters

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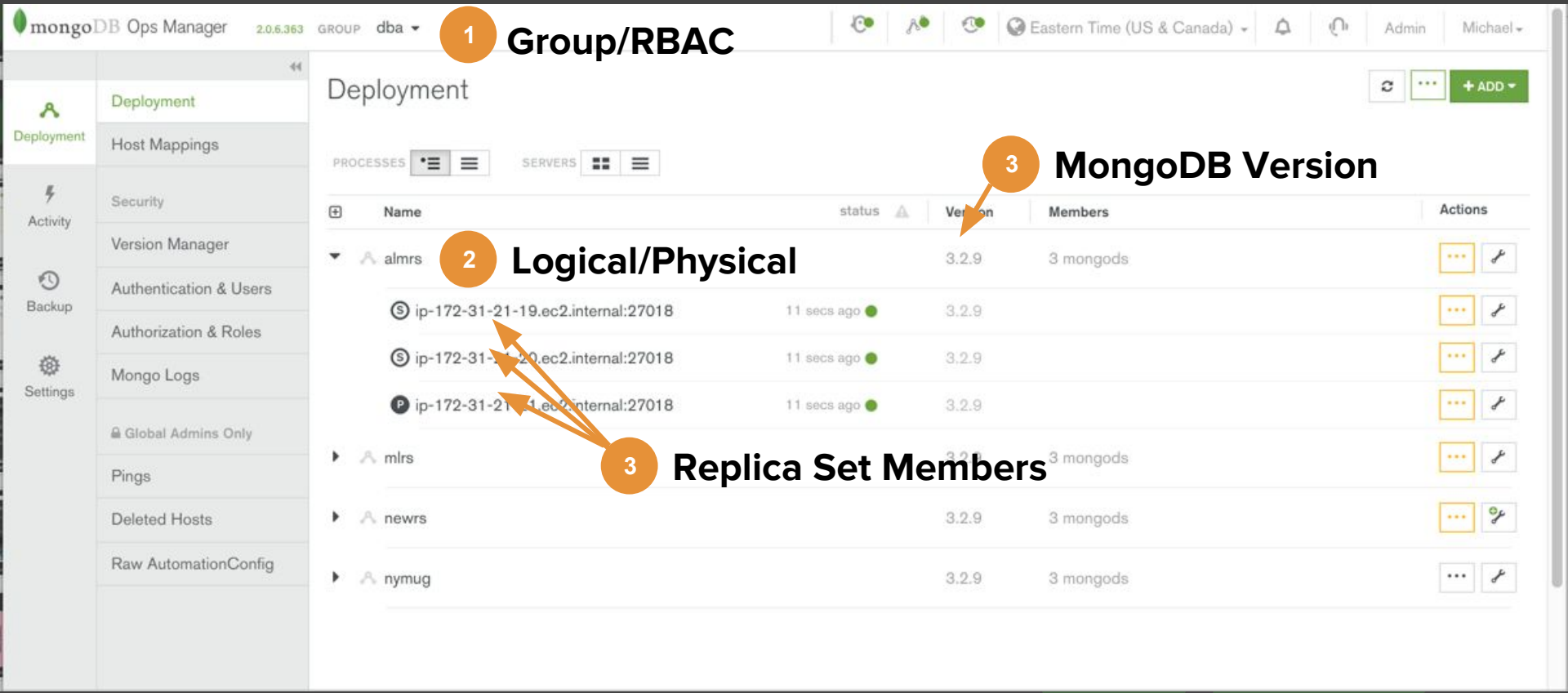
mongoDB Ops Manager
2.0.6.363
GROUP
dba
1
Group/RBAC
Eastern Time (US & Canada)
Admin
Michael
Deployment
Activity
Backup
Settings
Deployment
Host Mappings
Security
Version Manager
Authentication & Users
Authorization & Roles
Mongo Logs
Global Admins Only
Pings
Deleted Hosts
Raw AutomationConfig
Deployment
+ ADD
PROCESSES
SERVERS
3
MongoDB Version
Name
status
Members
Actions
almrs
2
Logical/Physical
3.2.9
3 mongods
ip-172-31-21-19.ec2.internal:27018
11 secs ago
3.2.9
ip-172-31-21-20.ec2.internal:27018
11 secs ago
3.2.9
ip-172-31-21-21.ec2.internal:27018
11 secs ago
3.2.9
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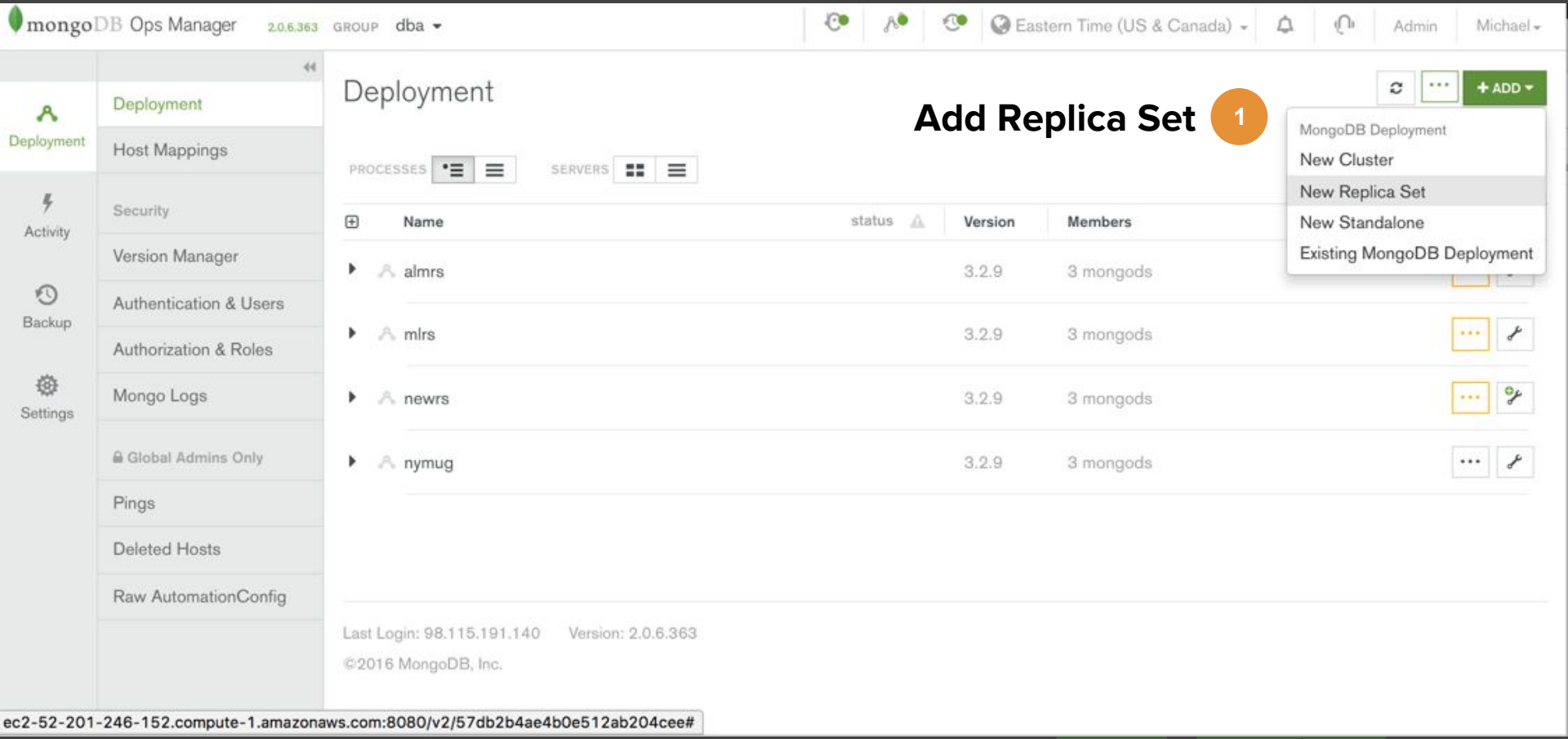
3 mongods
3
Replica Set Members
newrs
3.2.9
3 mongods
nymug
3.2.9
3 mongods

mongoDB


mongoDB Ops Manager
2.0.6.363
GROUP
dba
Eastern Time (US & Canada)
Admin
Michael
Deployment
Activity
Backup
Settings
Deployment
Host Mappings
Security
Version Manager
Authentication & Users
Authorization & Roles
Mongo Logs
Global Admins Only
Pings
Deleted Hosts
Raw AutomationConfig
Deployment
PROCESSES
SERVERS
Add Replica Set
1
+ ADD
MongoDB Deployment
New Cluster
New Replica Set
New Standalone
Existing MongoDB Deployment
Name
status
Version
Members
almrs
3.2.9
3 mongods
mlrs
3.2.9
3 mongods
newrs
3.2.9
3 mongods
nymug
3.2.9
3 mongods
Last Login: 98.115.191.140
Version: 2.0.6.363
©2016 MongoDB, Inc.
ec2-52-201-246-152.compute-1.amazonaws.com:8080/v2/57db2b4ae4b0e512ab204cee#

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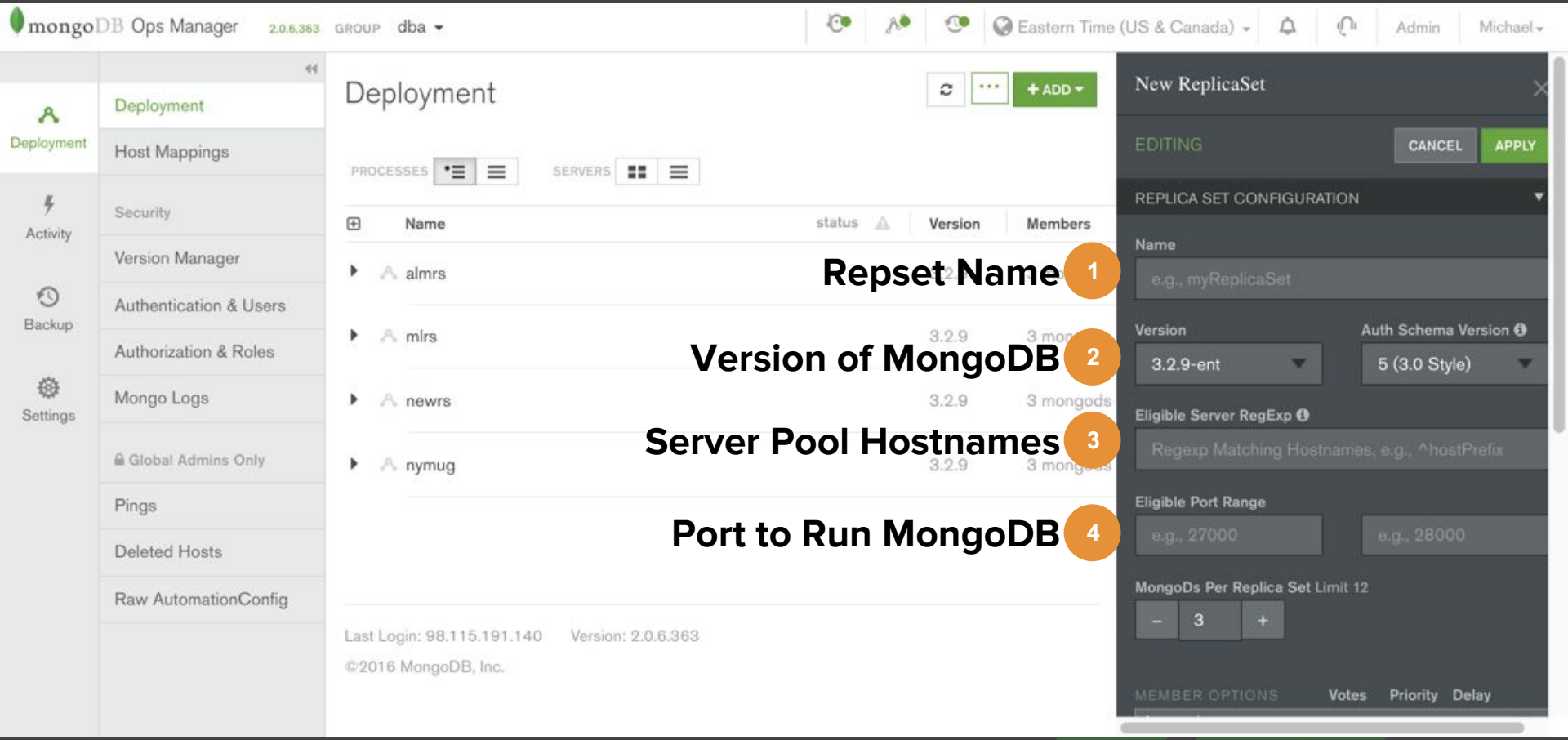
mongoDB Ops Manager 2.0.6.363 GROUP dba
Eastern Time (US & Canada)
Admin
Michael
Deployment
Activity
Backup
Settings
Deployment
Host Mappings
Security
Version Manager
Authentication & Users
Authorization & Roles
Mongo Logs
Global Admins Only
Pings
Deleted Hosts
Raw AutomationConfig
Deployment
+ ADD
PROCESSES
SERVERS
Name
status
Version
Members
almrs
mlrs
3.2.9
newrs
3.2.9
3 mongods
nymug
3.2.9
Last Login: 98.115.191.140
Version: 2.0.6.363
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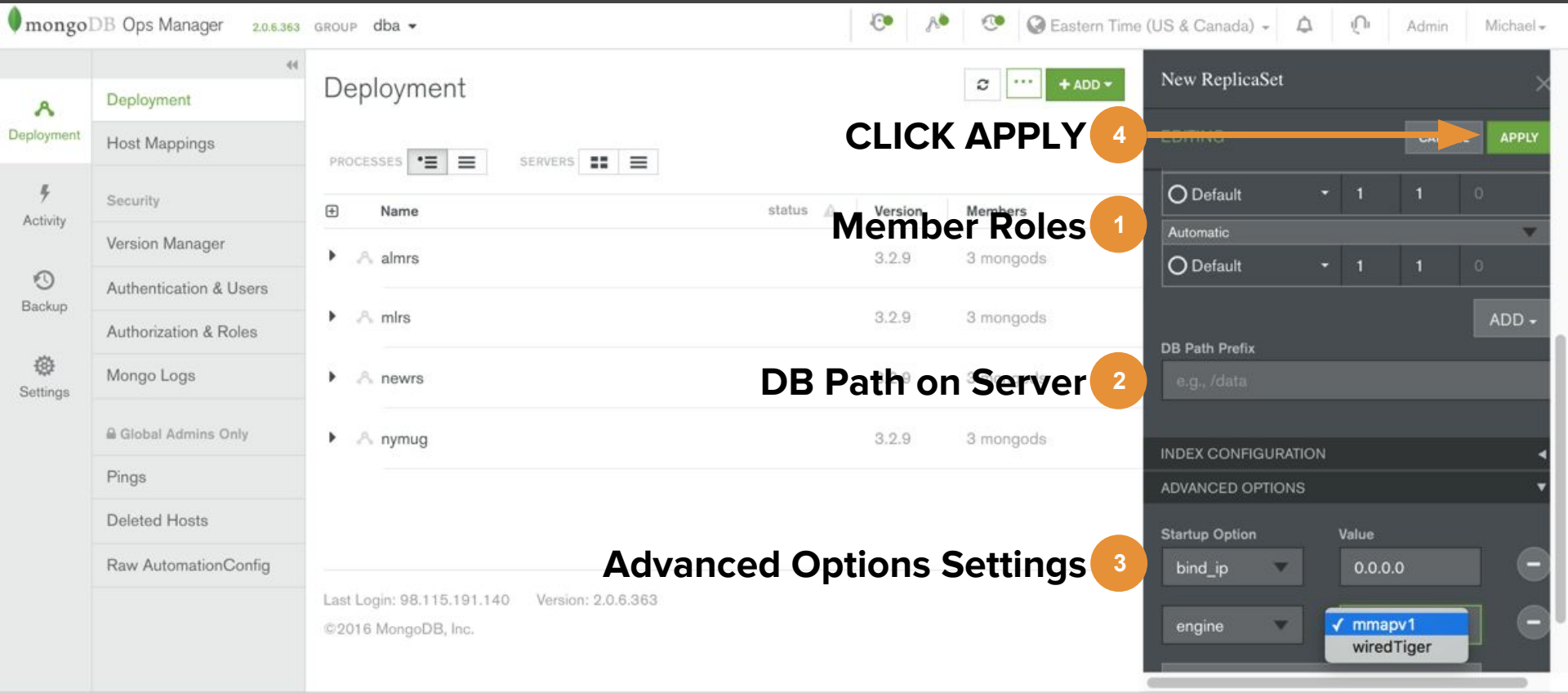
Repset Name
1
Version of MongoDB
2
Server Pool Hostnames
3
Port to Run MongoDB
4
New ReplicaSet
EDITING
CANCEL
APPLY
REPLICA SET CONFIGURATION
Name
e.g., myReplicaSet
Version
3.2.9-ent
Auth Schema Version
5 (3.0 Style)
Eligible Server RegExp
Regexp Matching Hostnames, e.g., ^hostPrefix
Eligible Port Range
e.g., 27000
e.g., 28000
MongoDs Per Replica Set Limit 12
3
MEMBER OPTIONS
Votes
Priority
Delay

mongoDB


mongoDB Ops Manager
2.0.6.363
GROUP
dba
Eastern Time (US & Canada)
Admin
Michael
Deployment
Activity
Backup
Settings
Deployment
Host Mappings
Security
Version Manager
Authentication & Users
Authorization & Roles
Mongo Logs
Global Admins Only
Pings
Deleted Hosts
Raw AutomationConfig
Deployment
+ ADD
PROCESSES
SERVERS
Name
status
Version
Members
almrs
3.2.9
3 mongods
mlrs
3.2.9
3 mongods
newrs
nymug
3.2.9
3 mongods
Last Login: 98.115.191.140
Version: 2.0.6.363
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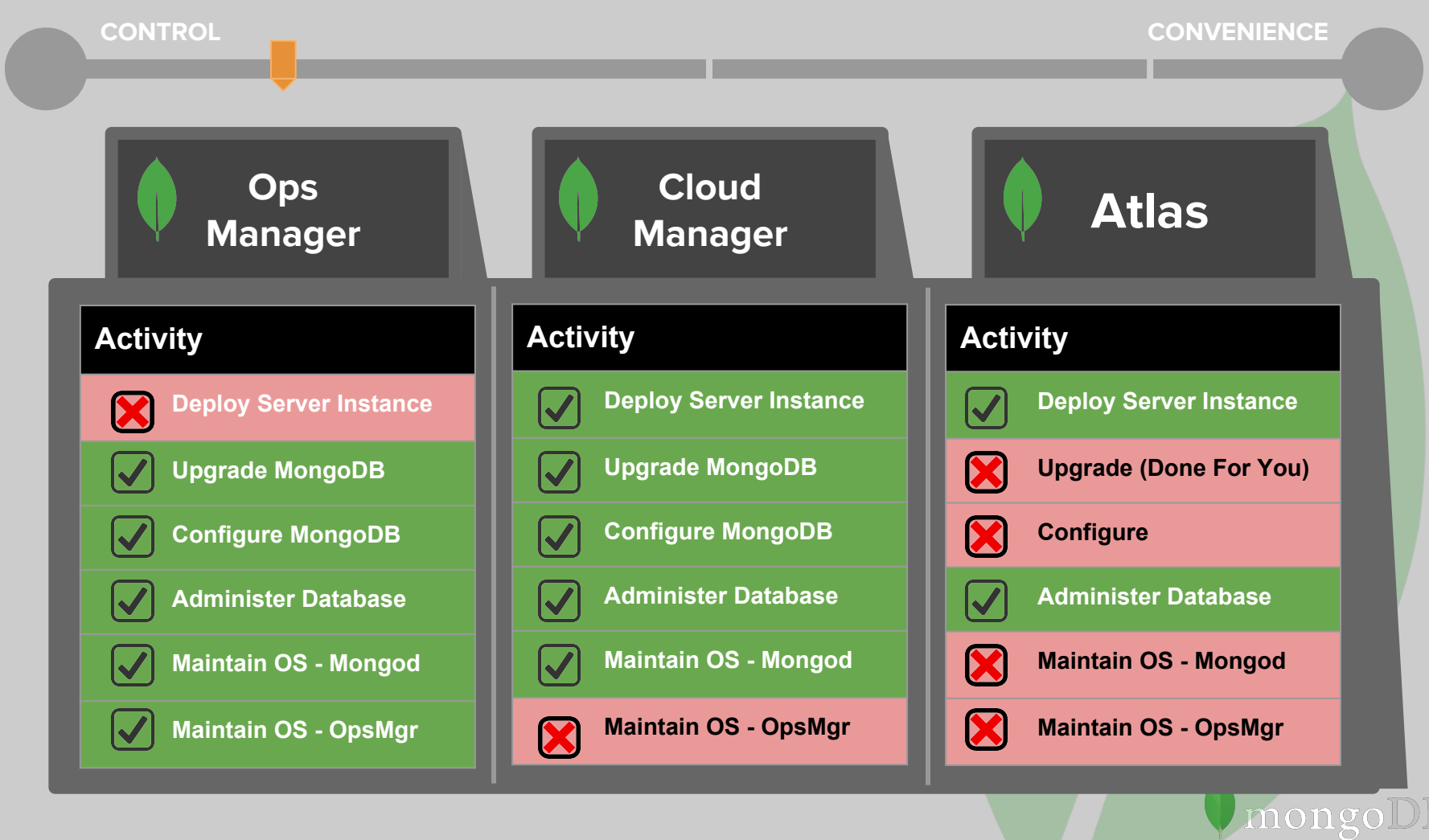
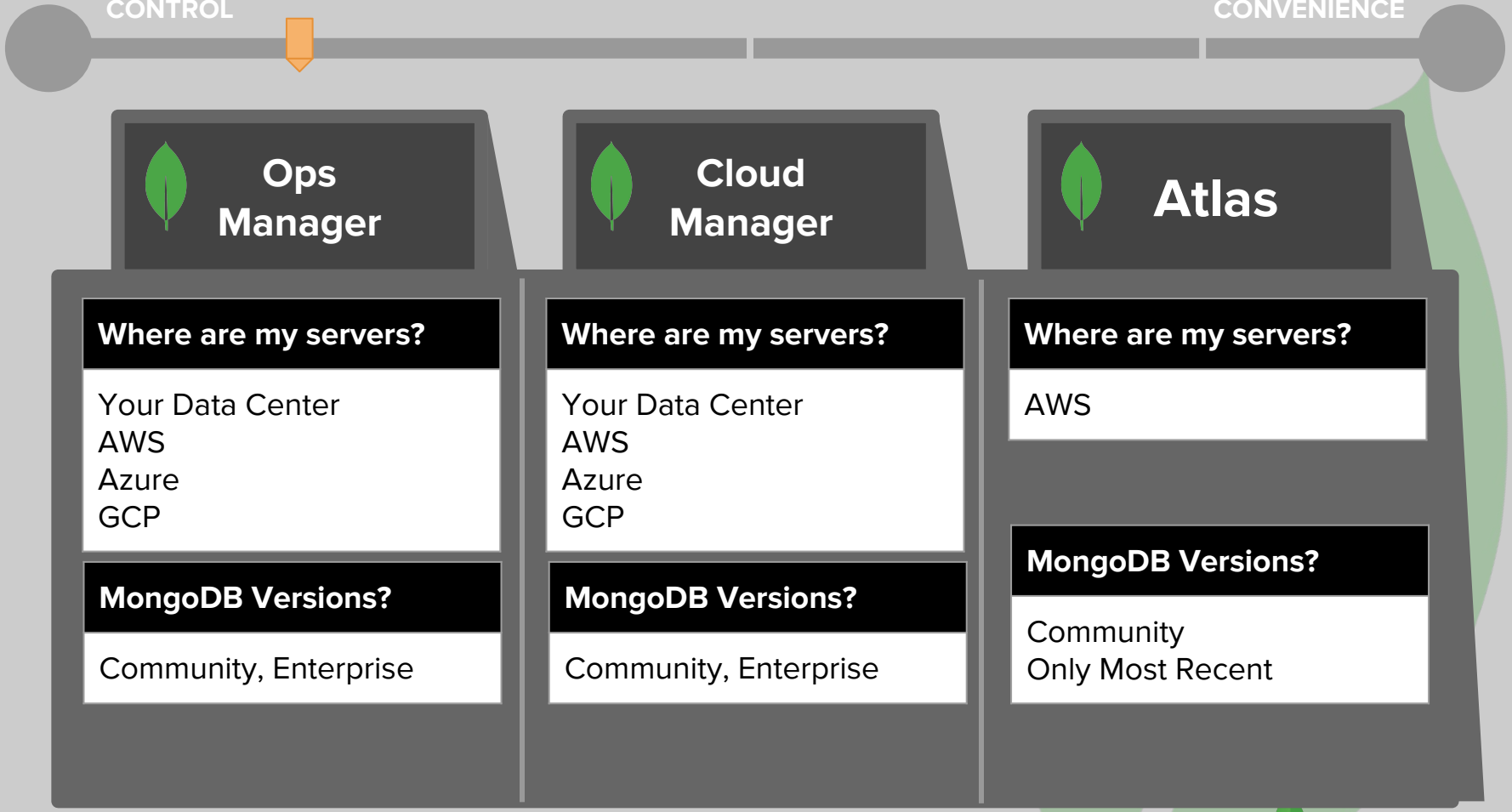
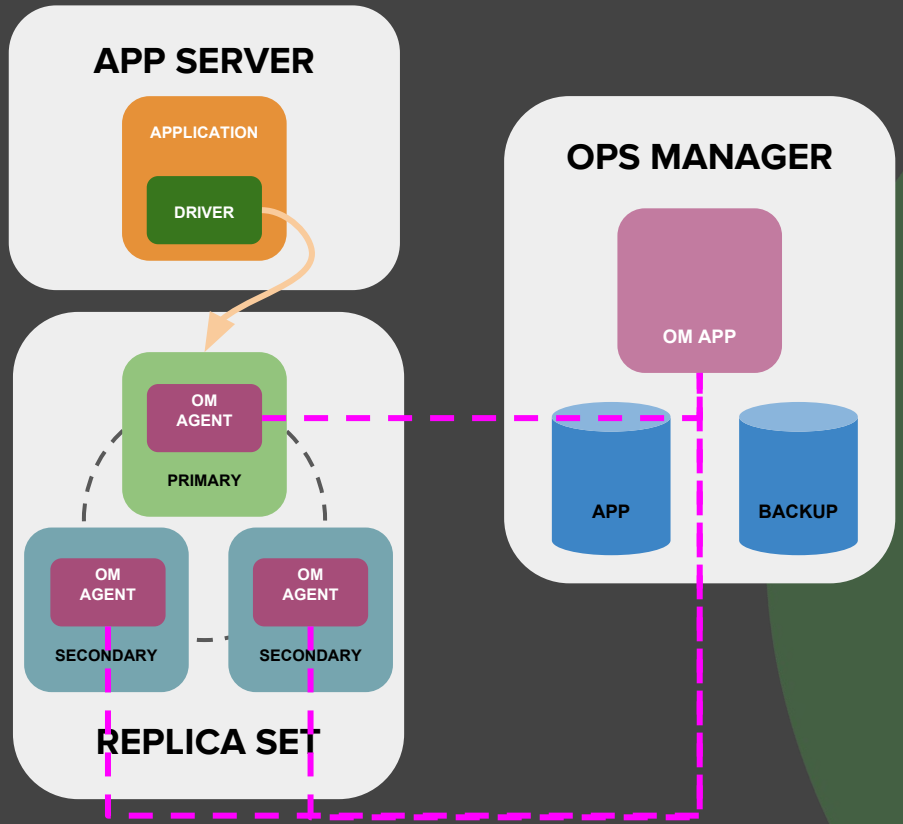
CLICK APPLY
4
Member Roles
1
DB Path on Server
2
Advanced Options Settings
3
New ReplicaSet
APPLY
Default
1
1
0
Automatic
Default
1
1
0
ADD
DB Path Prefix
e.g., /data
INDEX CONFIGURATION
ADVANCED OPTIONS
Startup Option
Value
bind_ip
0.0.0.0
engine
mmapv1
wiredTiger

mongoDB

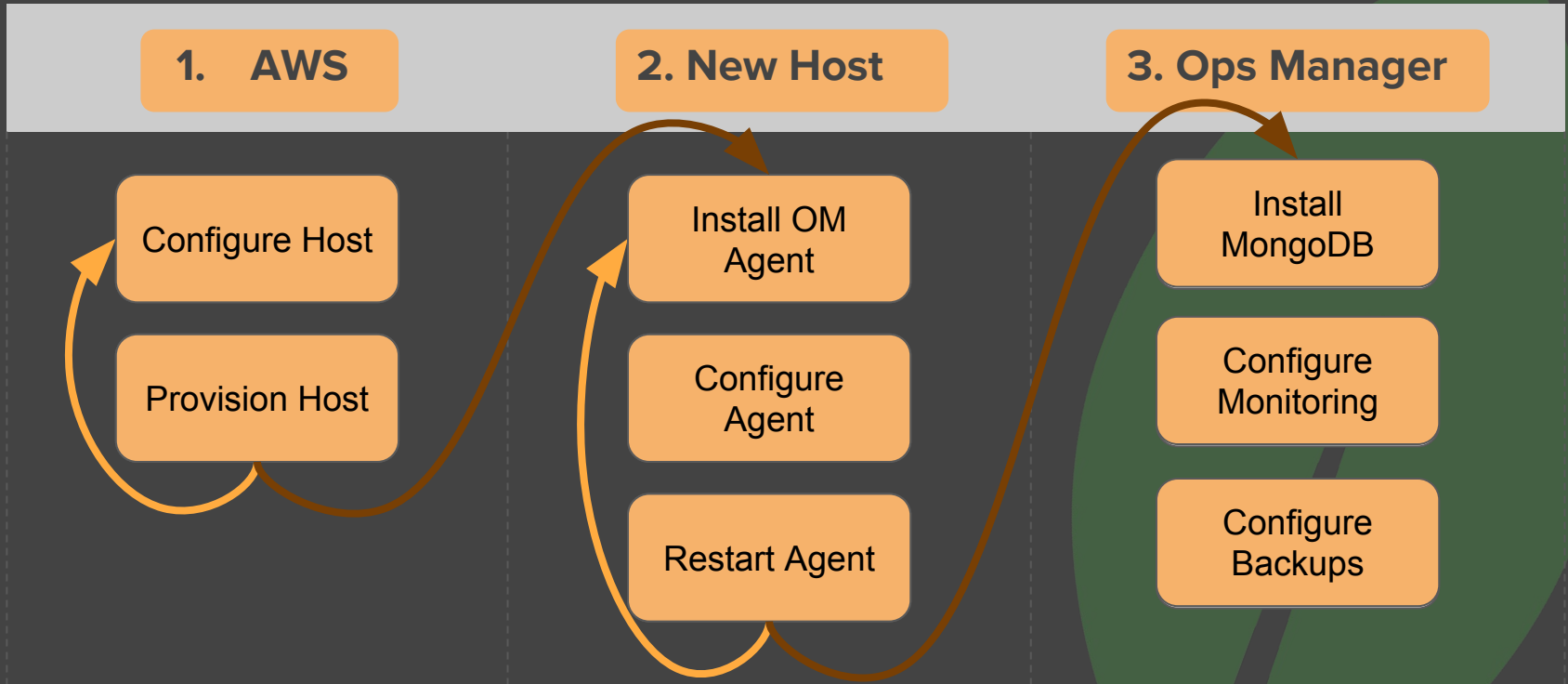

CONTROL
CONVENIENCE
Ops Manager
Activity
Deploy Server Instance
Upgrade MongoDB
Configure MongoDB
Administer Database
Maintain OS - Mongod
Maintain OS - OpsMgr
Cloud Manager
Activity
Deploy Server Instance
Upgrade MongoDB
Configure MongoDB
Administer Database
Maintain OS - Mongod
Maintain OS - OpsMgr
Atlas
Activity
Deploy Server Instance
Upgrade (Done For You)
Configure
Administer Database
Maintain OS - Mongod
Maintain OS - OpsMgr
mongoDB


CONTROL
CONVENIENCE
Ops Manager
Where are my servers?
Your Data Center
AWS
Azure
GCP
MongoDB Versions?
Community, Enterprise
Cloud Manager
Where are my servers?
Your Data Center
AWS
Azure
GCP
MongoDB Versions?
Community, Enterprise
Atlas
Where are my servers?
AWS
MongoDB Versions?
Community
Only Most Recent
mongoDB

Replica Set Architecture (w/ Ops Manager)



MongoDB Deployment - Ops Manager



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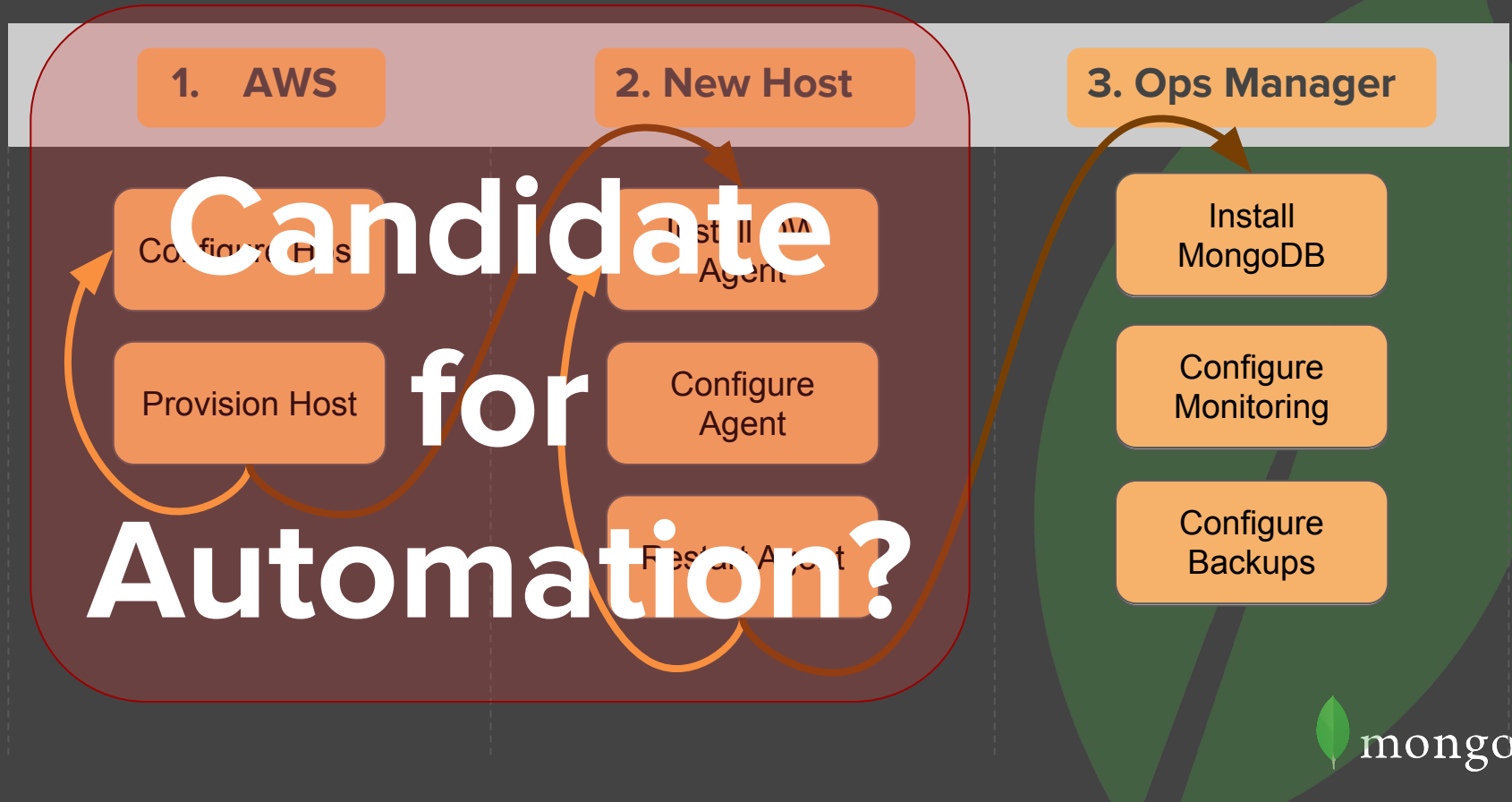
MongoDB Deployment - Cloud Manager & Atlas

MongoDB Deployment - Ops Manager



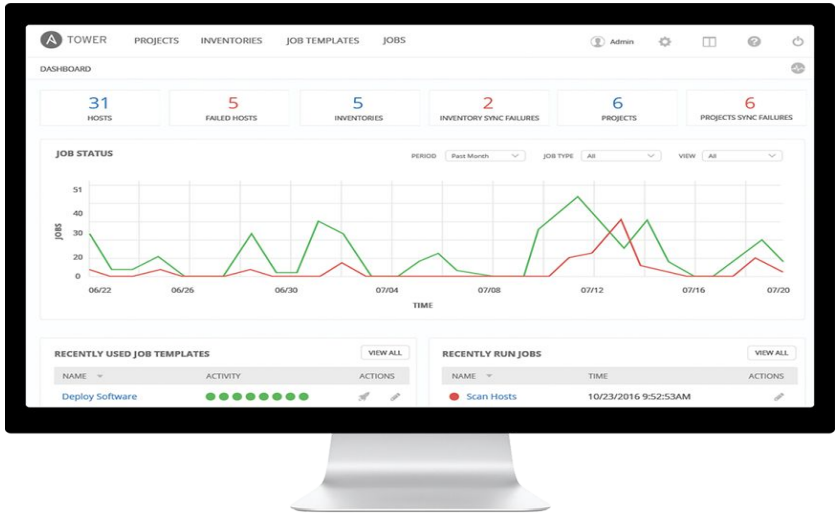

ANSIBLE

WHAT IS ANSIBLE?

It's a **simple automation language** that can perfectly describe an IT application infrastructure in Ansible Playbooks.

It's an **automation engine** that runs Ansible Playbooks.

Ansible Tower is an **enterprise framework** for controlling, securing and managing your Ansible automation with a **UI and RESTful API.**



SIMPLE

Human readable automation

No special coding skills needed

Tasks executed in order

Get productive quickly

POWERFUL

App deployment

Configuration management

Workflow orchestration

Orchestrate the app lifecycle

AGENTLESS

Agentless architecture

Uses OpenSSH & WinRM

No agents to exploit or update

More efficient & more secure

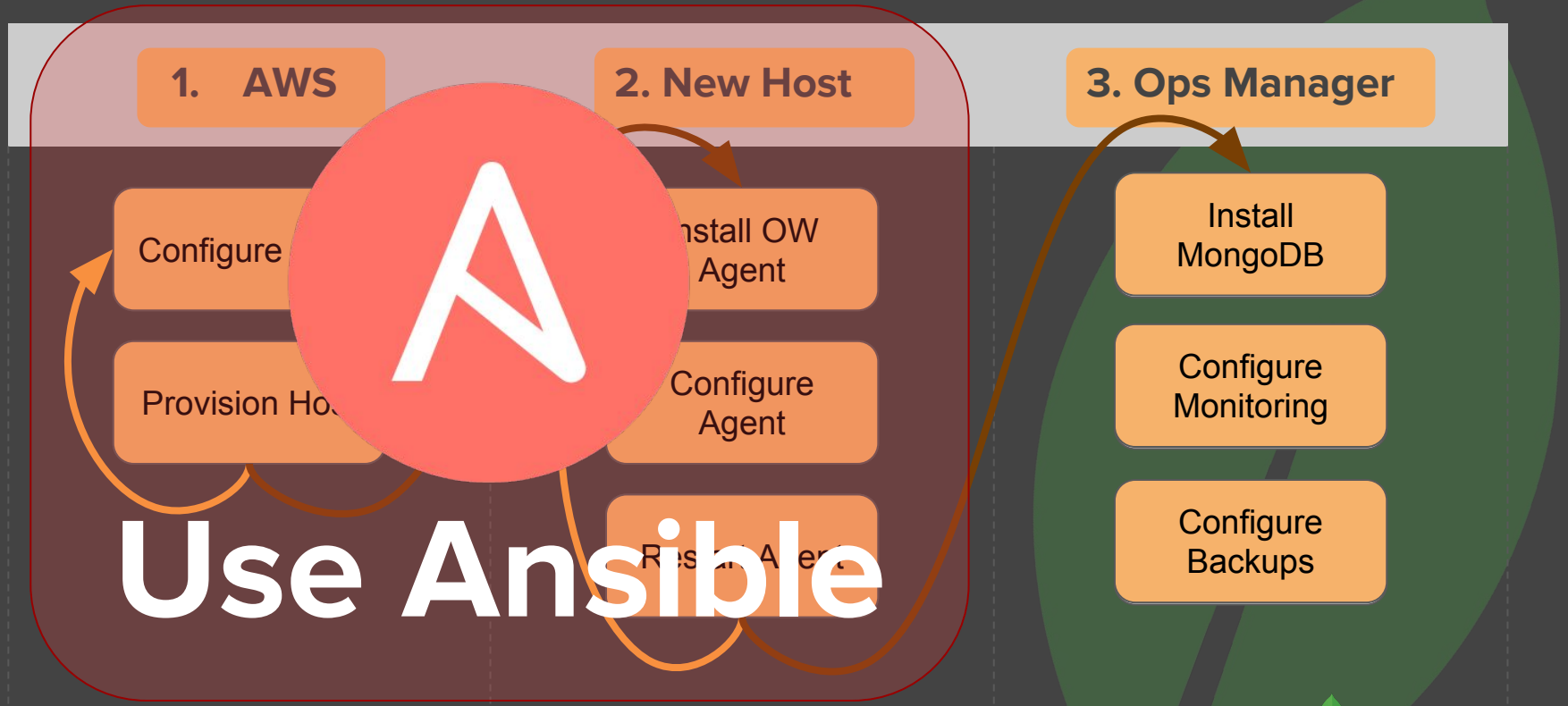
ANSIBLE TOWER

TOWER EMPOWERS TEAMS TO AUTOMATE

CONTROL Scheduled and centralized jobs	**KNOWLEDGE** Visibility and compliance	**DELEGATION** Role-based access and self-service
SIMPLE Everyone speaks the same language	**POWERFUL** Designed for multi-tier deployments	**AGENTLESS** Predictable, reliable, and secure

AT ANSIBLE'S CORE IS AN **OPEN-SOURCE** AUTOMATION ENGINE

MongoDB Deployment - Ops Manager



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Getting Started with Ansible - Lexicon

- Commands
  - ansible, ansible-playbook
- Hosts File
  - How ansible finds the servers you want to manage
- Plays, Playbooks
  - The execution tools to carry out your management
- Tasks & Modules
  - The components that connect ansible to the servers

Why Ansible?

- Simple
- Human Readable
- Agentless (uses SSH)
- Popular - Lots of Modules
- Used by Twitter, NASA, Spotify

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Getting Started with Ansible - Groups

```
ansible -m ping -i ansible-hosts
opsManager
```

Here I'm telling ansible to use the ping module against the opsManager group in my ansible-hosts file.

Demo of Ansible

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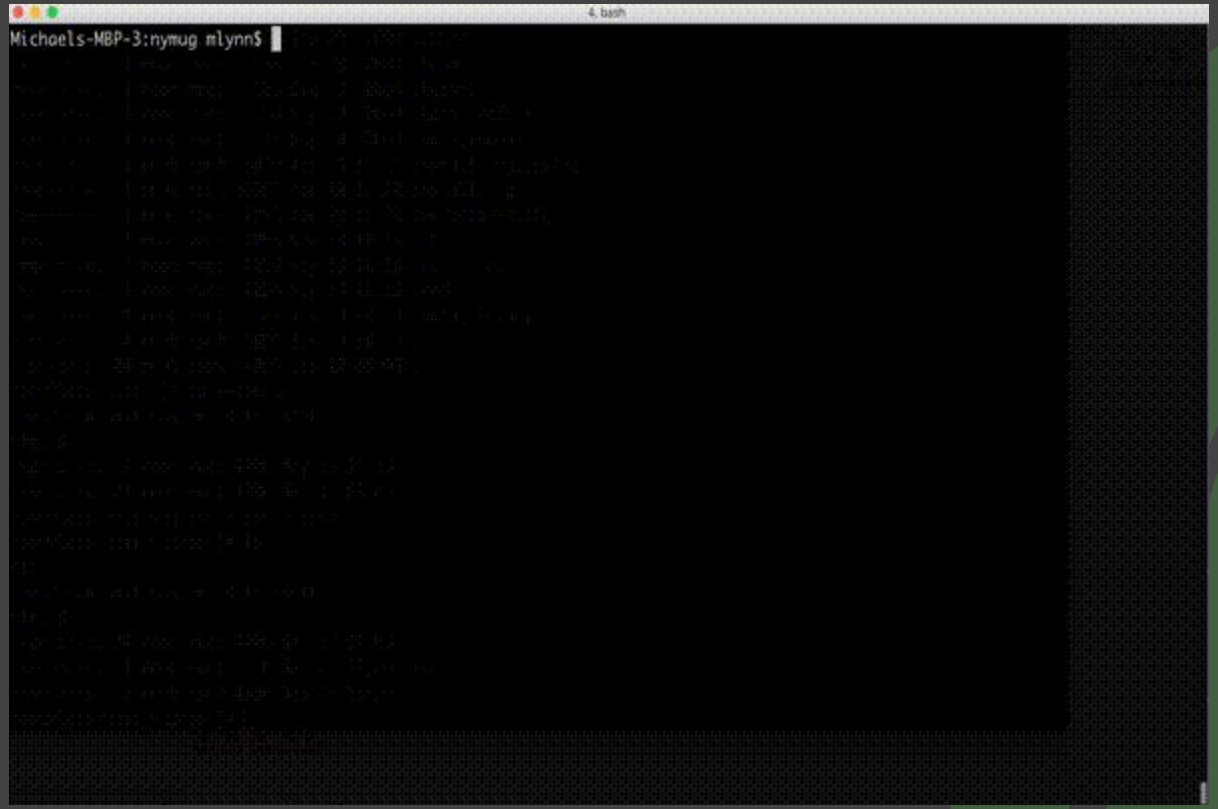
1 - Ansible Configuration Files



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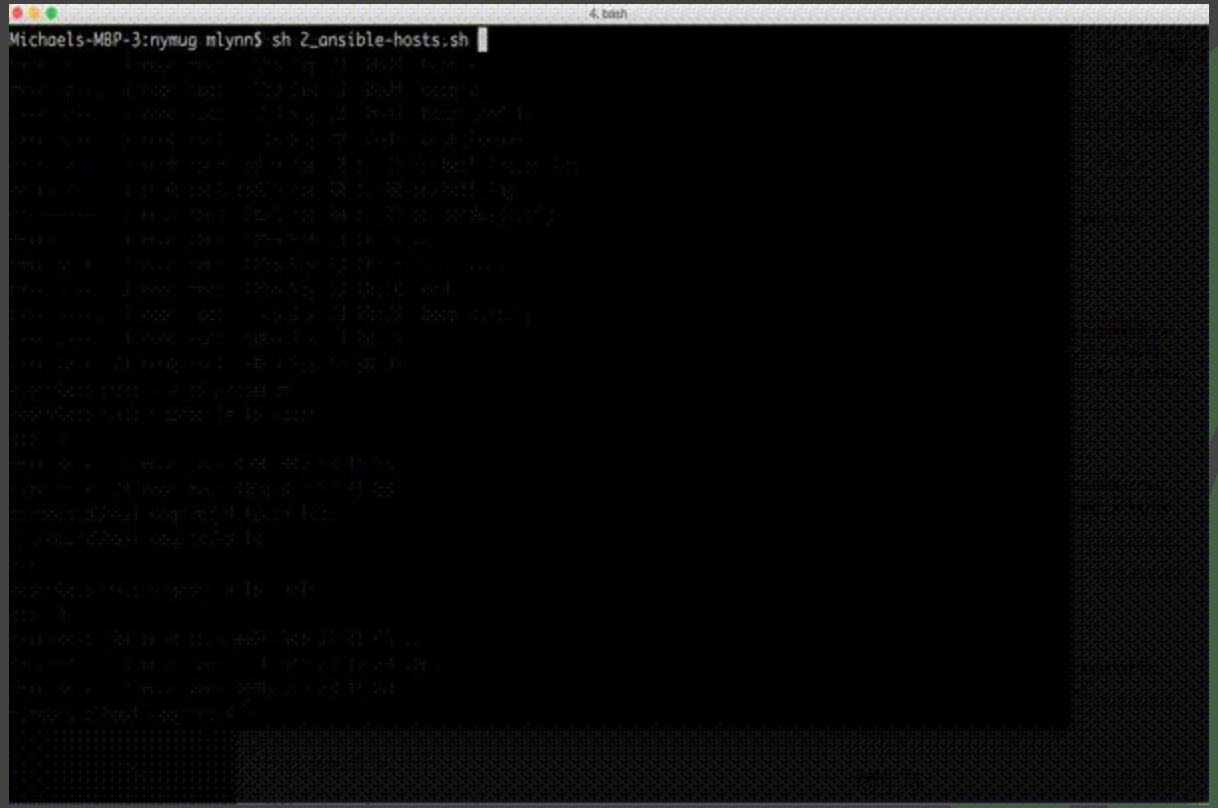
2 - Ansible Hosts File



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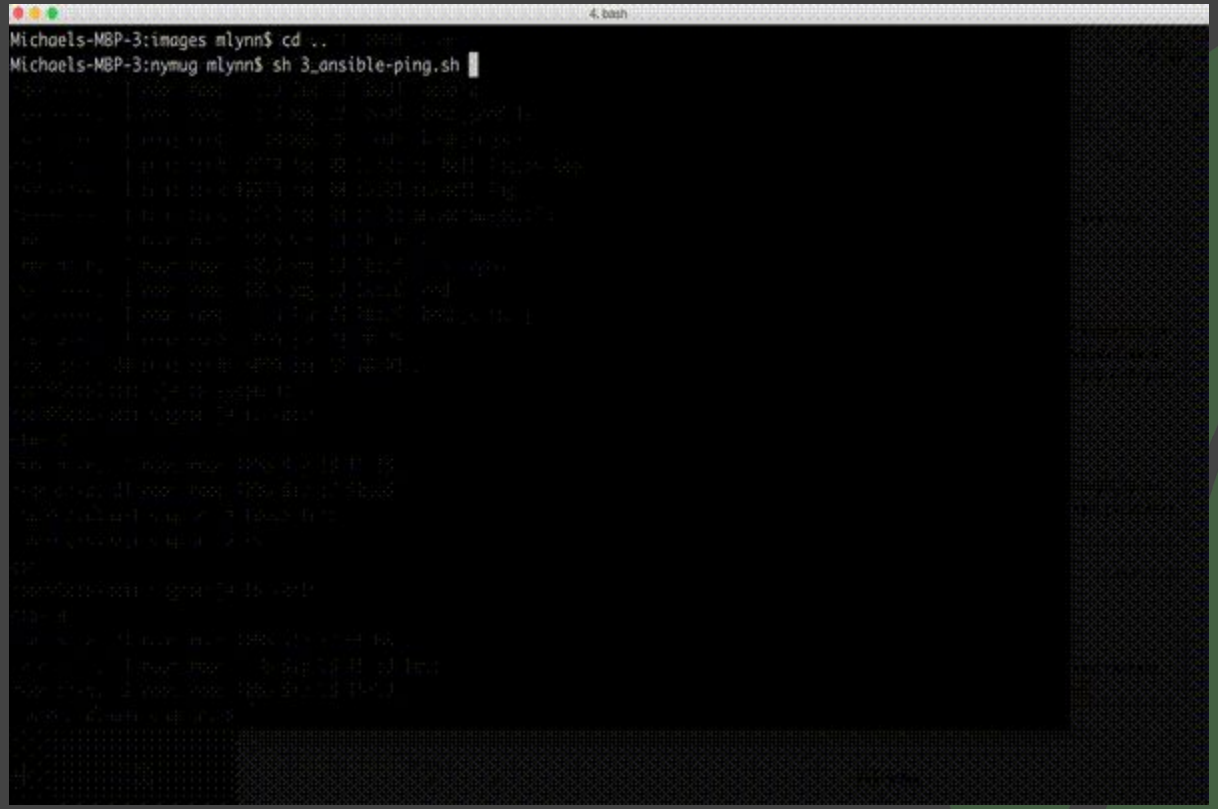
3 - Ansible Modules - Ping



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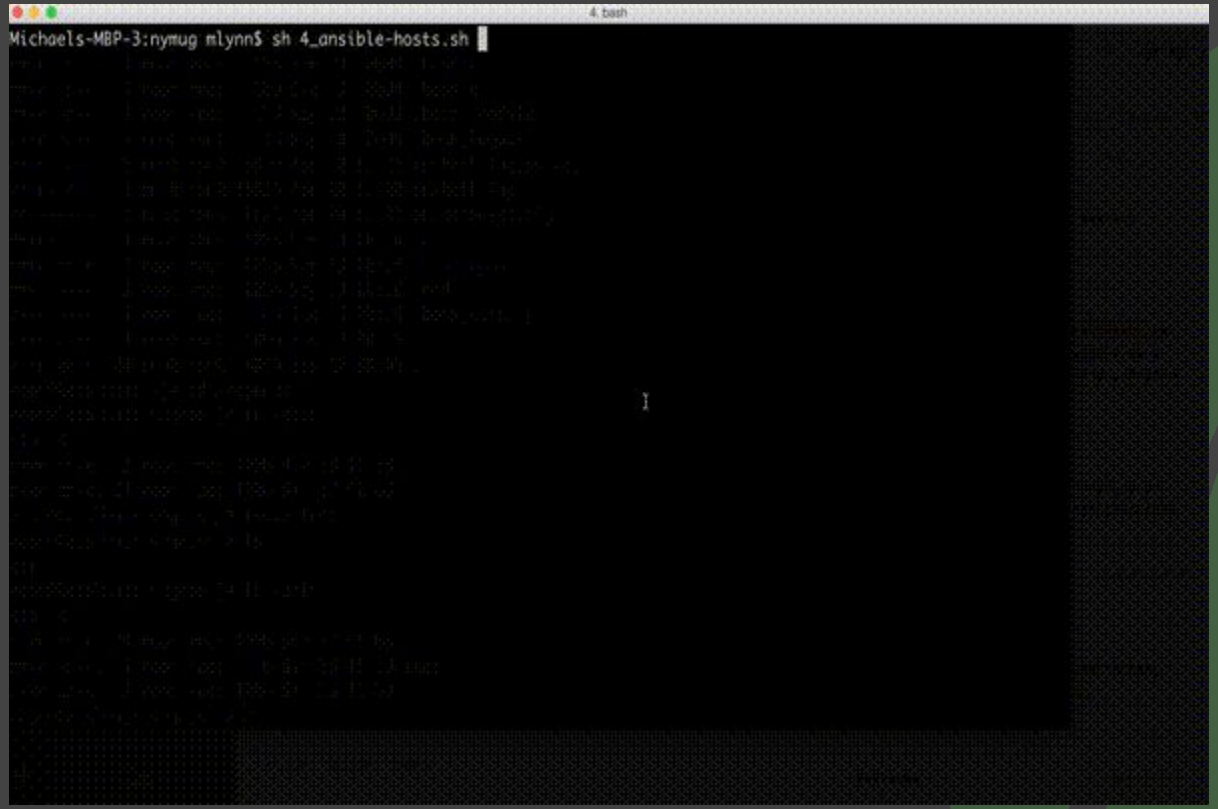
4 - Ansible Environment Variables



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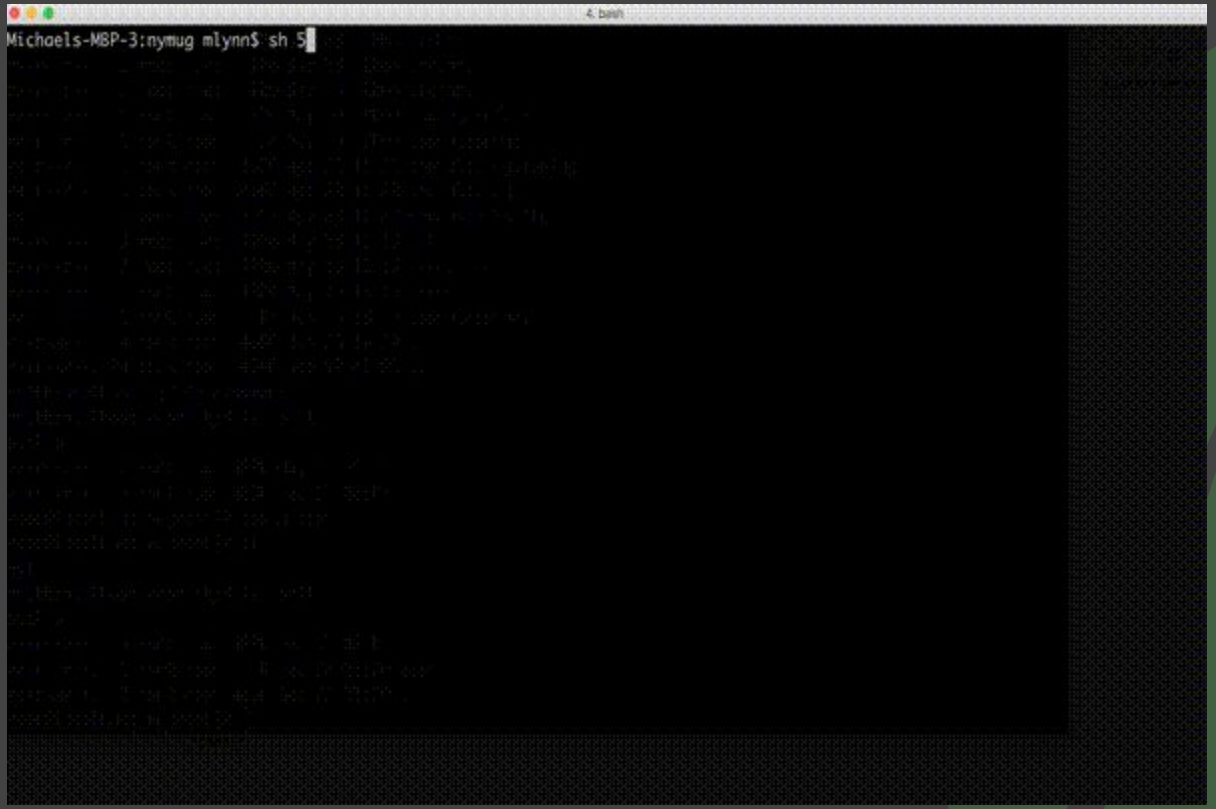
5 - Ansible Modules - Script



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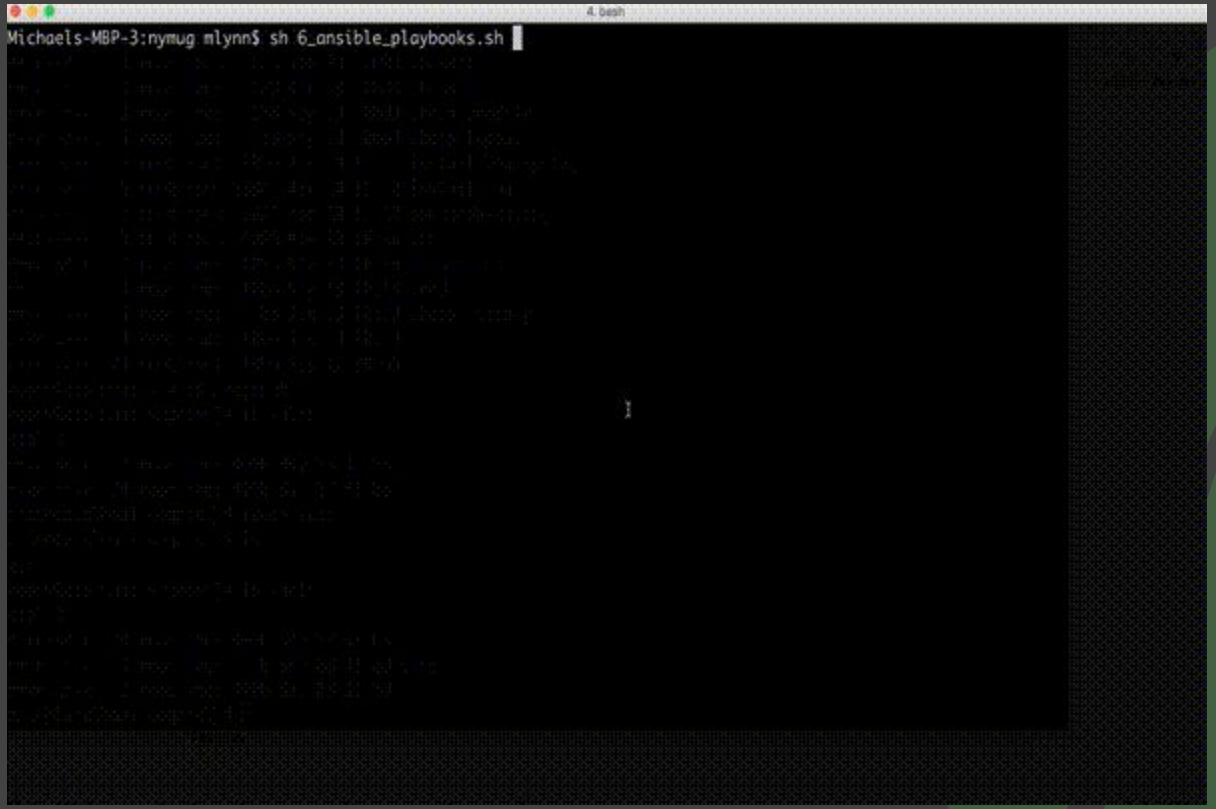
6 - Ansible Playbooks



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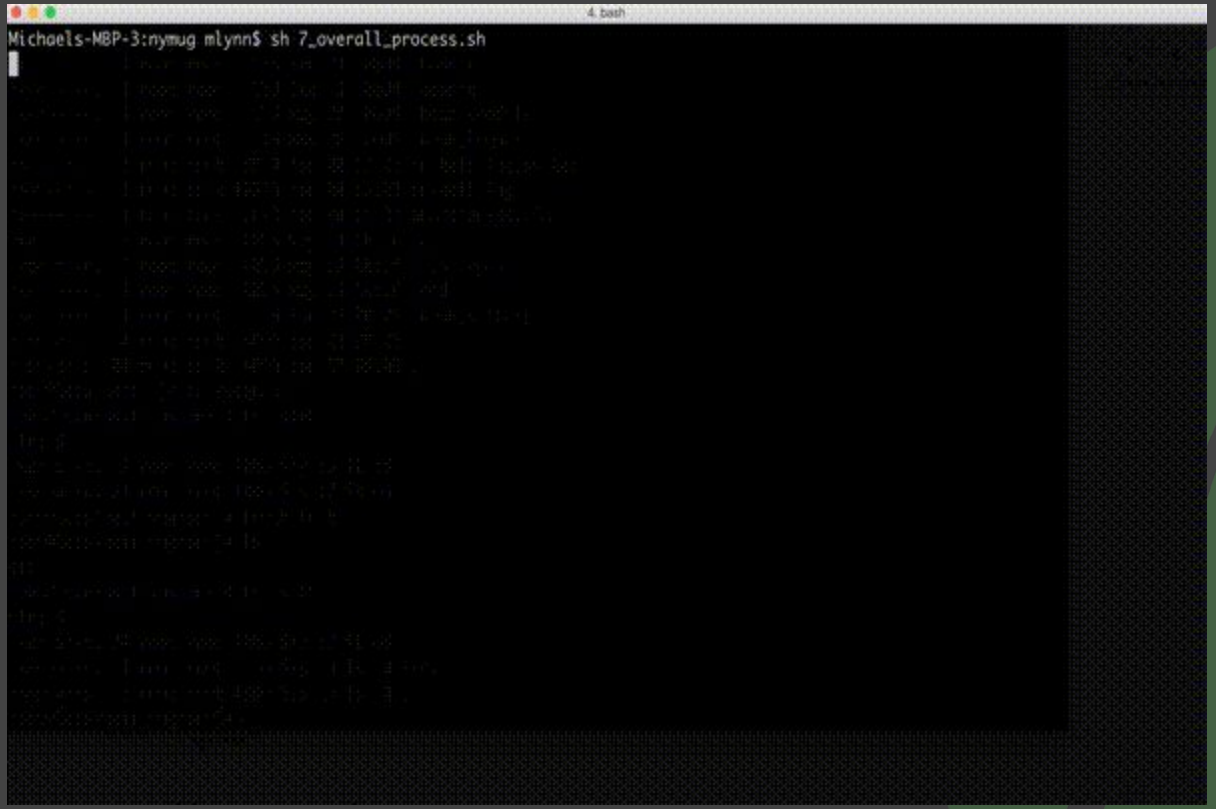
7 - Deploying O/M in Playbooks



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MongoDB Enterprise Advanced

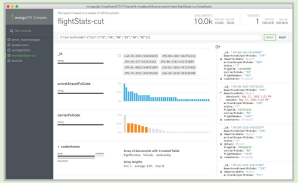
24 x 7 Support

MongoDB Ops Manager

- Monitoring & Alerting
- Query Optimization
- Automation & Configuration
- Backup & Recovery

REST API

MongoDB Compass



- Schema Visualization
- Data Exploration
- Ad-Hoc Queries

MongoDB Connector for BI

- Visualization
- Analysis
- Reporting

- Emergency Patches
- Customer Success Program
- On-Demand Online Training
- Platform Certifications

Commercial License

- Encryption at Rest
- LDAP & Kerberos
- Auditing
- FIPS 140-2

MongoDB Enterprise Server

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Questions?

Get These Scripts and Slides:
http://github.com/mrlynn/ansible-demo

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Attic / Parking Lot

- Slides probably not used in the presentation.

Demonstration Setup

Command	Description
`ansible -m ping -i ansible-hosts all`	Using the ping module and the hosts file ansible-hosts in the current directory, ping all hosts
`export ANSIBLE_HOSTS=./ansible_hosts`	Save some time - ansible uses environment variables extensivel
`ansible -m ping all`	Same as before - but now ansible leverages the env var to find the ansible hosts file.

Demonstration

Command	Description
`ansible -m script test.sh all`	Here, we take a local script and execute it across all of our hosts. Ansible takes that script and delivers it via scp to the hosts, executes it and captures the output.
`export ANSIBLE_HOSTS=./ansible_hosts`	Save some time - ansible uses environment variables extensivel
`ansible -m ping all`	Same as before - but now ansible leverages the env var to find the ansible hosts file.

Appendix A - /etc/ansible/hosts sample

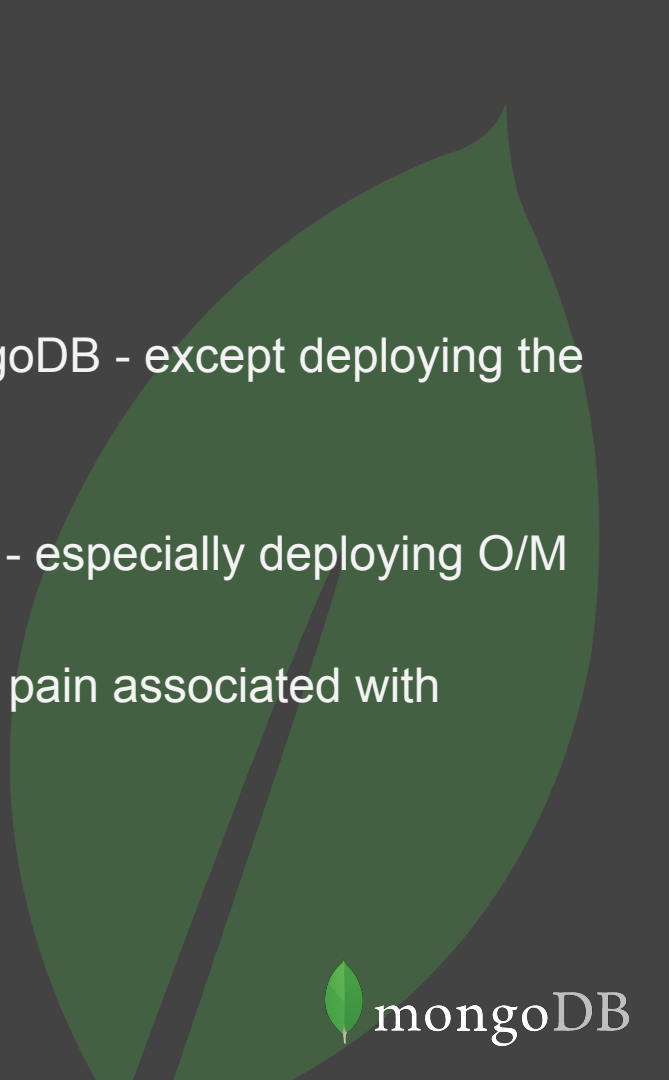
```
[opsManager]

ec2-54-93-114-205.eu-central-1.compute.amazonaws.com ansible_user=ec2-user

[amlReplicaSet]

ec2-54-93-79-122.eu-central-1.compute.amazonaws.com ansible_user=ec2-user

ec2-54-93-176-246.eu-central-1.compute.amazonaws.com ansible_user=ec2-user

ec2-54-93-207-148.eu-central-1.compute.amazonaws.com ansible_user=ec2-user

[amlReplicaSet:vars]

opsmanagerurl=http://ec2-54-93-114-205.eu-central-1.compute.amazonaws.com:8080

opsmanager=ec2-54-93-114-205.eu-central-1.compute.amazonaws.com
```

Appendix B - ansible.cfg

```
[defaults]

host_key_checking = False

private_key_file = PATH/TO/AWS/KEY.FILE


[ssh_connection]

control_path = %(directory)s/%%C
```

Post-Demo Check-in

- **Ops Manager**
  - Automation for all the things you do with MongoDB - except deploying the agent.
- **Ansible**
  - Automation for configs, deployment and more - especially deploying O/M Agents
- I hope you learned some ways you can relieve the pain associated with managing your MongoDB deployment.



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Appendix A: Setup

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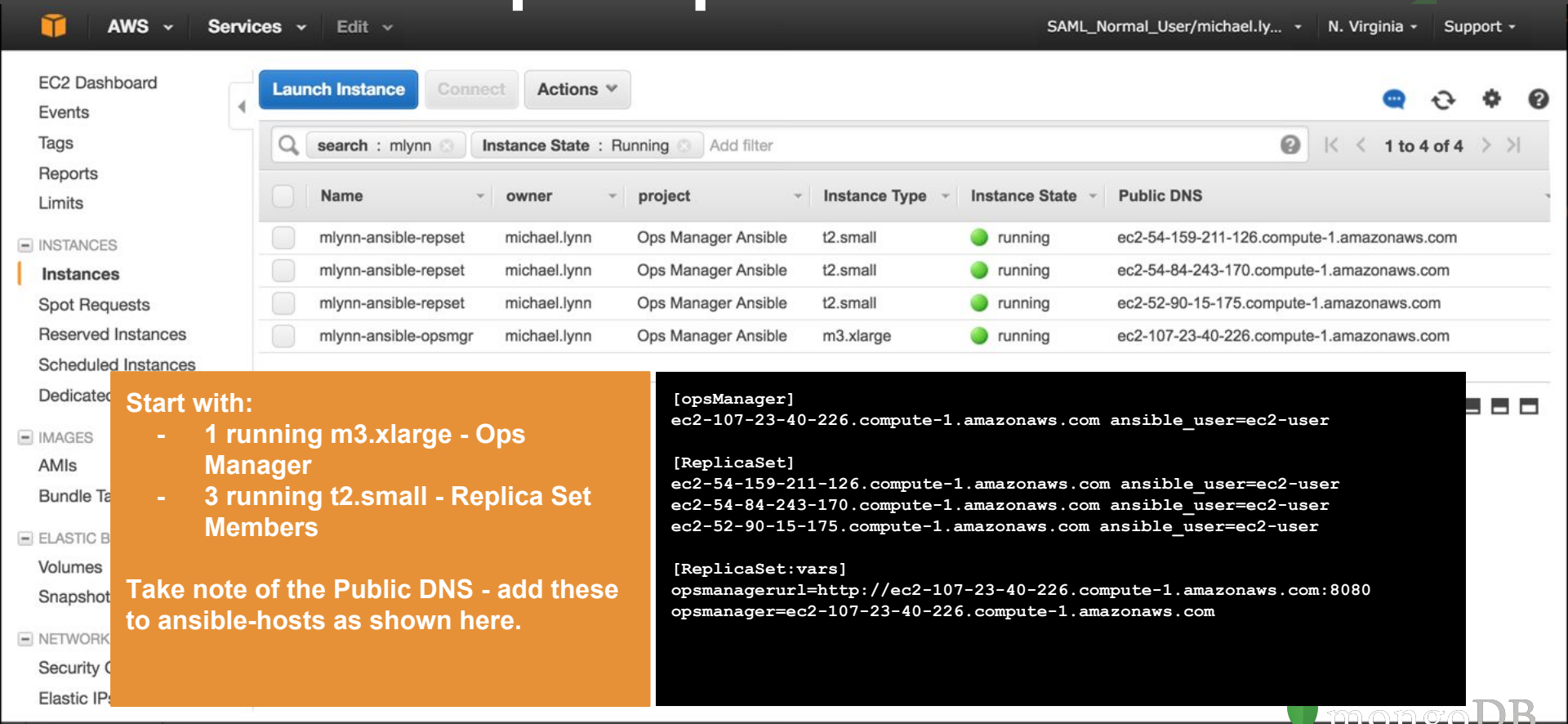
Setup Step 1 - Configure Keys

```
Michaels-MBP-3:setup mlynn$ cat ansible.cfg
[defaults]
host_key_checking = False
private_key_file = /Users/mlynn/.ssh/michael.lynn.pem
```

- Create or identify your AWS key.
- Locate the ansible.cfg file in the setup directory of this repo.
- Modify ansible.cfg to point to your AWS Key.

Setup Step 1 - EC2 Hosts



Start with:

- **1 running m3.xlarge - Ops Manager**
- **3 running t2.small - Replica Set Members**

Take note of the Public DNS - add these to ansible-hosts as shown here.

```
[opsManager]
ec2-107-23-40-226.compute-1.amazonaws.com ansible_user=ec2-user

[ReplicaSet]
ec2-54-159-211-126.compute-1.amazonaws.com ansible_user=ec2-user
ec2-54-84-243-170.compute-1.amazonaws.com ansible_user=ec2-user
ec2-52-90-15-175.compute-1.amazonaws.com ansible_user=ec2-user

[ReplicaSet:vars]
opsmanagerurl=http://ec2-107-23-40-226.compute-1.amazonaws.com:8080
opsmanager=ec2-107-23-40-226.compute-1.amazonaws.com
```

Setup Step 2 - Install OpsManager Package

Start with:

- 1 running m3.xlarge - Ops Manager
- 3 running t2.small - Replica Set Members

Take note of the Public DNS - add these to ansible-hosts as shown here.

```
[opsManager]
ec2-54-209-123-125.compute-1.amazonaws.com ansible_user=ec2-user

[ReplicaSet]
ec2-107-23-249-134.compute-1.amazonaws.com ansible_user=ec2-user
ec2-174-129-139-203.compute-1.amazonaws.com ansible_user=ec2-user
ec2-52-91-79-187.compute-1.amazonaws.com ansible_user=ec2-user

[ReplicaSet:vars]
opsmanagerurl=http://ec2-54-209-123-125.compute-1.amazonaws.com:8080
opsmanager=ec2-54-209-123-125.compute-1.amazonaws.com
```