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SECURING CLOUD BASED FUSION MIDDLEWARE APPLICATIONS

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ABSTRACT

Cloud computing represents the next generation of sharing computing and storage resources over a network in a self-service manner without direct involvement in how that computing and storage is resourced. Utilization of the cloud via third-party, web-based providers, such as Amazon EC2, Amazon S3 and Google App Engine, is becoming increasingly common. However, cloud computing is also available to enterprises as private clouds, meant to leverage existing investments in data centers and help overcome some of the physical and political barriers to cloud computing adoption. In general, a private cloud is a centralized shared infrastructure with automated capacity adjustment that internal business units utilize in a self-service manner.

Keywords: Amazon VPC, Virtual Private Cloud, AWS VPC, EC2, Security Groups, Oracle Fusion middleware App, Scalable, High availability, Cluster, ADF, Weblogic.

INTRODUCTION

This document gives steps to provision a mid-size virtual machine on amazon cloud EC2, there by selecting the RHEL Linux platform, setting up the Linux parameters hardening database, Installing weblogic application server and hardening weblogic server.

System Model

All the recommendations provided are to be followed manually by administrator. Its recommended to install OS, required Application as fusion middleware app and then do the hardening followed by application hardening

Previous work

A lot of articles are present in weblogic domain. However this article is mainly to address need to security when deploy the application on cloud based platform.

PROPOSED METHODOLOGY

a. Create a virtual private cloud in AWS.
b. After making VPC ascribes an internet gateway that links virtual private cloud to internet hence, provides access to resources of amazon web services like S3.
c. Next is to form a virtual private cloud subnet in which the EC2 instances are launched.
d. To facilitate the traffic flow amid internet and subnet a routing is customary in the virtual private cloud. In the diagram the circle marked R (implied router) depicts that your VPC is routing between subnet and internet.
e. To regulate inbound and outbound traffic flow you ought to set up a security group for the instances launched by you.
f. An instance having private IP is launched into the subnet.
g. In addition, an Elastic IP is assigned to instance which is a public IP and the already assigned private IP.
h. EC2 console is available at https://console. aws.amazon.com/ec2/.
i. From EC2's dashboard click on Launch Instance.
j. From Create New Instance, choose Classic Wizard and click Continue.
k. Quick Start tab on Choose an AMI page shows list of configurations which are called Amazon Machine Images. Click your AMI and press Select.
l. To launch single micro instance in the subnet leave default value that is Micro in Instance Type menu on

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m. Instance Details page.
n. Select VPC tab available under Launch Instance and make certain your subnet is checked in Subnet drop down and press Continue.
o. IP address to be used for your instance can be indicated in Advance Instance Options.
p. To use default storage click on Continue.
q. Enter tags required for instance if any and click on Continue.
r. From Create Key Pair either an existing key pair can be selected or a new one can be created.
s. To create a new key pair:
t. Click on Create New Key Pair.
u. Enter name for the key pair (like Virtual_key) and press Create and Download Key Pair.
v. When the key is prompted it should be protected in a benign place on the system and click on Continue.
w. The Configuration Firewall page contains Choose one or more of the existing Security Group. Select the group created by you earlier i.e. WebserverSG.
x. Settings can be reviewed from the Review page to make sure everything is in place.
y. Click Launch in order to launch the instance.
z. All the pre-installation mandates have to be followed irrespective of the infra needs.
aa. Partition: Server should have partition for /root, /boot,/usr,/var ,/tmp,and/home. Third party should be installed on /opt
bb. Ports : all default ports should be replaced with non-default ports

Installation tasks

- Create the database with advance option click next.
- DBCA will start automatically for configuring components.
- Assign a common password for SYS user Select OMF as file option.
- Do not fill anything in recovery area. Use UNICODE UTF-8 as CHAR set.
- Execute orainstRoot.sh and root.sh from root user.

Security configuration

Remove tkprof from cloud system.
Change listener port from 1521 to 1526.
Change connection manager default port from 1630 to 1636 using cman in ORACLE_HOME/network/admin.
Change http port from 1158 to 1160 using ecma-reconfigure ports-DBCONTROL_HTTP_PORT.
Change RMI port to 5520 to 5526 ecma-reconfigure ports-DBCONTROL_HTTP_PORT
DB user should not be left open. They should have all the account as locked which are not being used. Check should be done against this

SELECTACCOUNT_STATUSFROMDBA_USERS

Change the password to be CASE sensitive

ALTER SYSTEM SET
SEC_CASE_SENSITIVE_LOGON=TRUE;

Change the LISTERNER name to be a nonstandard name in listerner.ora file in $ORACLE_ HOME/network/admin
<new listener name > =
(Description =….)
Listener should have logging enabled
LSNRCTL> set log_status on;
LSNRCTL> save config;
All the files in ORACLE_HOME, except for bin should have the permission as 0750 or less

PROFILE MANAGEMENT

Following profile to be used for creating users
ALTER PROFILE <NAME > <PARAM> <VALUE>
Param Value
Failed_login attempts 10
Password_life_time 60
IDLE_TIME 180

No OS authentication to database should be allowed.
ALTER PROFILE <PROFILE> LIMIT PASSWORD_VERIFY_FUCNTION
verify_function_11G;

Verify vi /etc/sysctl.conf

kernel.shmmni = 4096
kernel.sem = 250 32000 100 128
net.ipv4.ip_local_port_range = 9000 65500
net.core.rmem_default = 262144
net.core.rmem_max = 4194304
net.core.wmem_default = 262144
net.core.wmem_max = 1048576

VERIFY VI /ETC/SECURITY/LIMITS.CONF

oracle soft nproc 2047
oracle hard nproc 16384
oracle soft nofile 1024
oracle hard nofile 65536
oretail soft nofile 4096
oretail hard nofile 65536

Securing weblogic server

Open the admin server using the http://hostname:port/console
Go to the domainname -> configuration and general tab
Change production mode = true, refer [1]
Click save and active the changes
Shutdown weblogic and start the domain

Configure the connection pool, Refer [3]
start weblogic script
nohup./startNodeManager.sh &

nohup./startWeblogicServer.sh &
Note: nohup is to ensure that execution runs in background of the server. This will be helpful if any disconnection happens.
Go to config.xml in the $WL_HOME/config folder
And change the ports
<machine xsi:type="unix-machineType">
<name>lnxql99v2053</name>
<node-manager>
<nm-type>Plain</nm-type>
<listen-address>lnxql99v2053</listen-address>
<listen-port>5556</listen-port> -- change this default port
</node-manager>
</machine>

Enable configuration audit
Domain -> Configuration ->General tab
Go to the bottom of the page
Refer [4]

Enable SSL validation
Click on the manage server and then go to the SSL tab
Refer [5]

Disable Mbean attributes
Disable the M bean attributes from Domain-> Security tab
This can be done by unchecking the "autonomous adminlookup enabled"
Refer [6]

EXPERIMENTAL RESULTS

Access to application is disabled from all possible treats. Hardening ensures that proper throughput is achieved on the system.

Figure 1. Weblogic Configuration for production mode

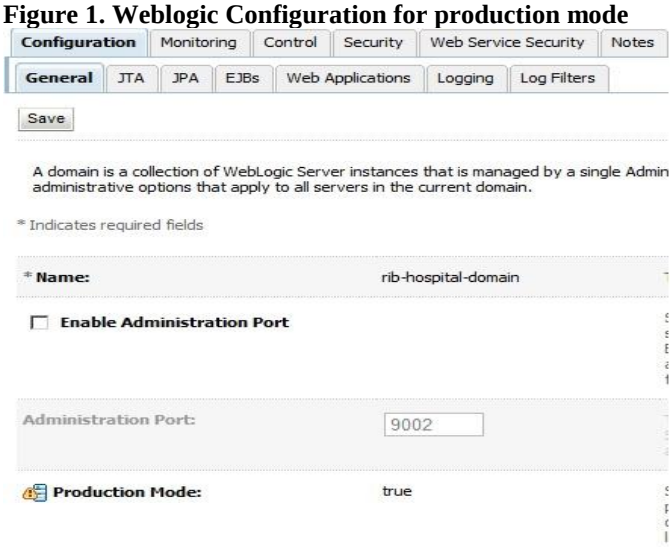


Figure 2. Manage server

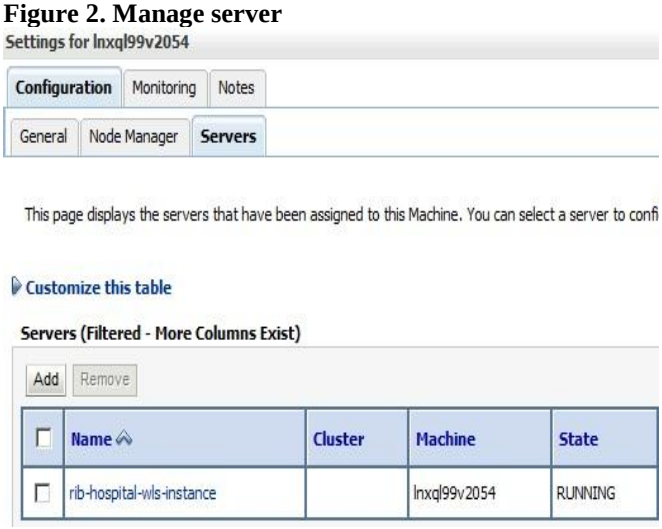


Figure 3. Create database connection using DS

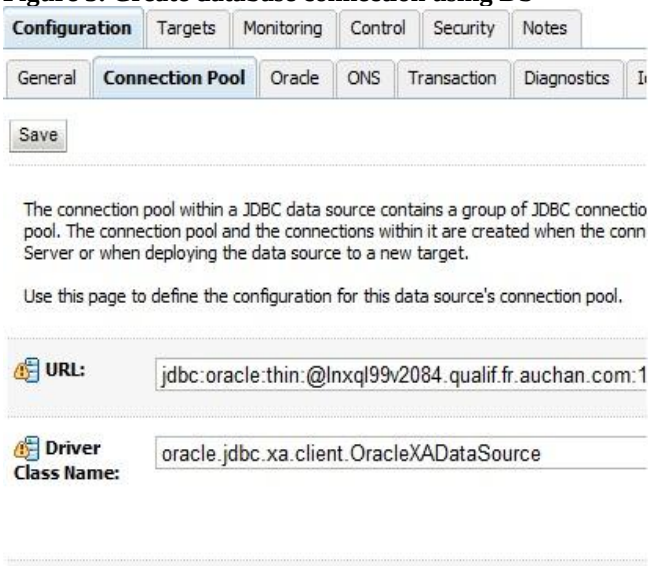


Figure 4. enable configuration audit

Figure 5. Enable SSL – secure layer on weblogic

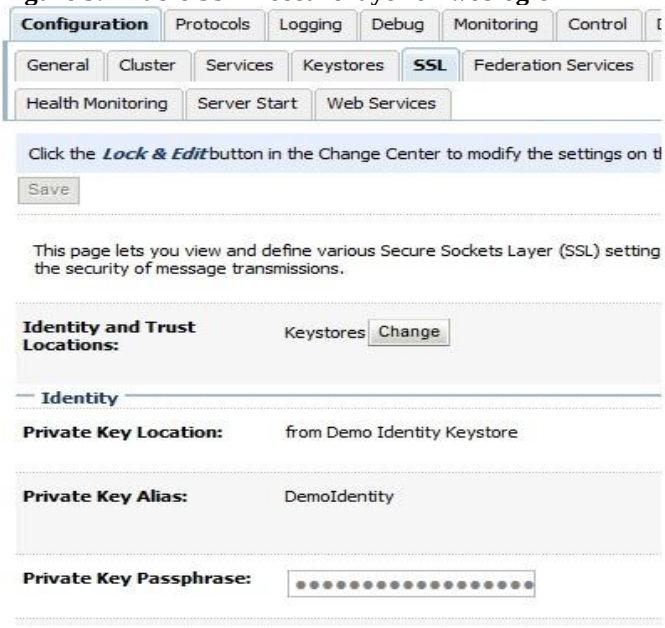
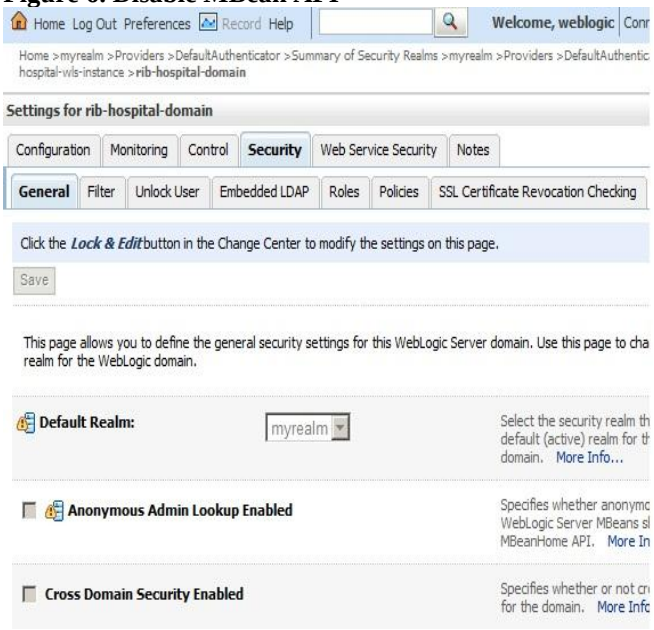


Figure 6. Disable MBean API



CONCLUSION

Fusion middleware application deployed on cloud console has to be secure. The above steps will ensure that database and weblogic are secured.

REFRENCES

1. AMAZON EC2 white papers.
2. ElasTras: An elastic, Scalable and self-Managed Transactional Database for the cloud by: Sudipto das, divyakant agarwal, and amr el abbadi, University of California, Santa Barbara.