

## Lab: Setting up the MQ Web Console on z/OS

In this lab, we will go through a basic configuration of the MQ web console on z/OS using basic authentication. The purpose of this exercise is to get the MQ web console up and running. The security configuration here is not sufficient to be used in any production environment.

Prerequisites:

- Java installed on z/OS
- MQ installed on z/OS. We are using MQ 9.3.5 here.
- Unix Systems Services active on z/OS

We've installed these all for you here!

Background and context:

- MQ Console: These enhancements have been made to the MQ Console to provide a more enjoyable user experience and reduce manual tasks to speed administration activities:
  - Storage class administration
  - Queue manager dashboards
  - Application dashboards
  - MQ Console overview tab
  - Improved application visibility
  - Localized time zones

Lab Instructions:

1. First, we will need to submit some JCL to create our web server. Our JCL executes the crtmmqweb executable in the MQ installation. From the ISPF main menu, go to option 3.4 to search for our JCL. Our JCL will be located in ZQS1.MQ.WEB.JCL. Put that in 'Dsname Level' and hit enter.

```
Menu  RefList  RefMode  Utilities  Help

Data Set List Utility

blank Display data set list          P Print data set list
V Display VT0C information          PV Print VT0C information

Enter one or both of the parameters below:
Dsname Level . . . ZQS1.MQ.WEB.JCL
Volume serial . . .

Data set list options
Initial View
1. Volume
2. Space
3. Attrib
4. Total

Enter "/" to select option
/ Confirm Data Set Delete
/ Confirm Member Delete
/ Include Additional Qualifiers
/ Display Catalog Name
- Display Total Tracks
- Prefix Dsname Level

When the data set list is displayed, enter either:
"/" on the data set list command field for the command prompt pop-up.
Option ==>
```

2. Following the below screenshot, enter an 'b' to the left of the data set name to browse its contents.

```
Menu Options View Utilities Compilers Help
-----
DSLIS - Data Sets Matching ZQS1.MQ.WEB.JCL Row 1 of 1
Command - Enter "/" to select action Message Volume
-----
E_ ZQS1.MQ.WEB.JCL MQ1PD1
***** End of Data Set List *****
```

3. Place an 'e' next to 'CRTMQWEB' and hit enter. This will put you in edit mode for the member.

```
Menu Functions Confirm Utilities Help
-----
EDIT ZQS1.MQ.WEB.JCL Row 0000001 of 0000007
Name Prompt Size Created Changed ID
_e CRTMQWEB *Edited 21 2024/01/08 2024/06/13 09:11:57 DQUINCY
MQANGEL 12 2024/01/08 2024/05/07 16:03:52 DQUINCY
MQWEBS 24 2024/01/08 2024/05/14 13:10:32 DQUINCY
NEW 22 2024/05/28 2024/05/28 15:33:57 DQUINCY
RACF 140 2024/01/08 2024/04/19 13:32:08 DQUINCY
XMQWEBS 4 2024/01/08 2024/04/19 12:56:08 DQUINCY
ZLSOF 21 2024/02/18 2024/04/19 12:56:37 DQUINCY
**End**
```

4. Normally, we will have to customize the JAVAHOME, MQPATH, and WLPUSER for our own z/OS environment. We will not have to customize here. We have done it for you.
  - a. JAVAHOME will reflect when Java is installed on your z/OS environment
  - b. MQPATH will reflect where the MQ binaries are accessible from
  - c. WLPUSER will be where the server directory will be created upon submitting the JCL

Sample JCL for CRTMQWEB:

```
//CRTMQWEB JOB 'MQ WEB',CLASS=A,REGION=0M,MSGCLASS=H,
// NOTIFY=&SYSUID
//*****
//* SET SYMBOLS
//*****
//EXPORT EXPORT SYMLIST=(*)
// SET JAVAHOME='/usr/lpp/java/J8.0_64'
// SET MQPATH='/usr/lpp/mqm/V9RXXMX/web'
// SET WLPUSER='/var/mqm'
//*****
//* Step crtmqweb - Use the crtmqweb command
//*****
//CRTMQWEB EXEC PGM=IKJEFT01,REGION=0M
//SYSTSPRT DD SYSOUT=*
//SYSERR DD SYSOUT=*
//STDOUT DD SYSOUT=*
//SYSTSIN DD *,SYMBOLS=EXEC SYS
BPXBATCH SH +
export JAVA_HOME=&JAVAHOME; +
export WLP_USER_DIR=&WLPUSER; +
&MQPATH/bin/crtmqweb &WLPUSER -p MQ
```

- Once you have reviewed the 3 above paths, submit the JCL by writing 'submit' in the command line and hitting enter.

```
EDIT          ZQS1.MQ.WEB.JCL(CRTMQWEB) - 01.09          Columns 00001 00072
***** Top of Data *****
==MSG> -Warning- The UNDO command is not available until you change
==MSG>          your edit profile using the command RECOVERY ON.
000001 //CRTMQWEB JOB 'MQ WEB',CLASS=A,REGION=0M,MSGCLASS=H,
000002 // NOTIFY=&SYSUID
000003 //*****
000004 //* SET SYMBOLS
000005 //*****
000006 //EXPORT EXPORT SYMLIST=(*)
000007 // SET JAVAHOME='/usr/lpp/java/J8.0_64'
000008 // SET MQPATH='/usr/lpp/mqm/V9RXXMX/web'
000009 // SET WLPUSER='/var/mqm'
000010 //*****
000011 //* Step crtmqweb - Use the crtmqweb command
000012 //*****
000013 //CRTMQWEB EXEC PGM=IKJEFT01,REGION=0M
000014 //SYSTSPRT DD SYSOUT=*
000015 //SYSERR DD SYSOUT=*
000016 //STDOUT DD SYSOUT=*
Command ==> submit Scroll ==> CSR
```

- Next, let's check out the angel process. What is that? The Liberty angel process is a started task that allows Liberty servers to use z/OS authorized services. It's long-lived and can be shared among your multiple Liberty servers. Use the F3 key to back out of CRTMQWEB and place an 'e' to the left of the MQANGEL member, then hit enter.

Sample JCL for MQANGEL:

```
//MQANGEL PROC PARMS='',COLD=N,NAME='MQANGEL',SAFLOG=Y

//*-----

// SET ROOT='/usr/lpp/mqm/V9RXXMX/web'

//*-----

//* Start the Liberty angel process for MQ

//*-----

//STEP1 EXEC PGM=BPXBATA2,REGION=0M,TIME=NOLIMIT,
// PARM='PGM &ROOT./lib/native/zos/s390x/bbgzangl COLD=&COLD NAME=X
// &NAME &PARMS SAFLOG=&SAFLOG'

//STDOUT DD SYSOUT=*

//STDERR DD SYSOUT=*
```

7. Lastly, let's check out the MQWEBS JCL. Using the 'e' edit function, make the following changes:

```
File Edit Edit_Settings Menu Utilities Compilers Test Help

EDIT      SYS1.PROCLIB(MQWEBS) - 01.08      Columns 00001 00072
***** Top of Data *****
==MSG> -Warning- The UNDO command is not available until you change
==MSG>      your edit profile using the command RECOVERY ON.
000001 //MQWEBS PROC PARMS='mqweb --clean'
000002 //*
000003 // SET INSTDIR='/usr/lpp/mqm/V9RXXM/web'
000004 // SET USERDIR='/var/mqm'
000005 //*
000006 //MQCONSOL EXEC PGM=BPXBATSL,REGION=0M,TIME=NOLIMIT,
000007 // PARM='PGM &INSTDIR./lib/native/zos/s390x/bbgzsrv &PARMS.'
000008 //WLPUDIR DD PATH='&USERDIR.'
000009 //STEPLIB DD DSN=MQ935CD.SCSQANLE,DISP=SHR
000010 // DD DSN=MQ935CD.SCSQAUTH,DISP=SHR
000011 //STDOUT DD SYSOUT=*
000012 //STDERR DD SYSOUT=*
000013 //STDIN DD DUMMY
000014 //STDENV DD *
000015 JAVA_HOME=/usr/lpp/java/J8.0_64
000016 WLP_USER_DIR=/var/mqm

000017 PATH=/usr/lpp/mqm/V9RXXM/web/bin:/bin:/usr/bin
000018 LIBPATH=/usr/lpp/mqm/V9RXXM/java/lib
000019 //ZTDENV DD *
000020 JAVA_HOME=/usr/lpp/java/J8.0_64
000021 WLP_USER_DIR=/var/mqm
000022 PATH=/usr/lpp/mqm/V9RXXM/web/bin:/bin:/usr/bin
000023 LIBPATH=/usr/lpp/mqm/V9RXXM/java/lib
000024 IBM_JAVA_OPTIONS=-Dcom.ibm.ws.zos.core.angelName=MQANGEL
```

8. We won't be submitting MQANGEL or MQWEBS, instead we will be adding it to the SYS1.PROCLIB. SYS1.PROCLIB is a system library in which the procedures that are included with the product are placed when you run the starter job.
9. Back out of MQANGEL and navigate to option 3.3 from the main menu. Enter the option 'C' for copy and then specify the member you'd like to copy next to 'Name'. NOTE! You must use single

```
Move/Copy Utility

Option ==> c

C Copy data set or member(s)      CP Copy and print
M Move data set or member(s)     MP Move and print

Specify "From" Data Set below, then press Enter key

From ISPF Library:
Project . . . . . (--- Options C and CP only ---)
Group . . . . .
Type . . . . .
Member . . . . . (Blank or pattern for member list,
                  "*" for all members)

From Other Partitioned or Sequential Data Set:
Name . . . . . 'ZQS1.MQ.WEB.JCL(MQANGEL)'
Volume Serial . . . . . (If not cataloged)

Data Set Password . . . . . (If password protected)

F1=Help      F3=Exit      F4=Return      F10=Actions      F12=CRetrieval
```

quotes around the data set names.

10. You want the destination for the copy to be 'SYS1.PROCLIB(MQANGEL)' . Specify this here.

The screenshot shows the MQS1 utility window with the following content:

```
File Edit Settings View Communication Actions Window Help
Menu RefList Utilities Help

COPY      From ZQS1.MQ.WEB.JCL(MQANGEL)

Specify "To" Data Set Below

To ISPF Library:          Options:
Project . . .             Enter "/" to select option
Group . . .               _ Replace like-named members
Type . . .                / Process member aliases
Member . . .              (Blank unless member is to be renamed)

To Other Partitioned or Sequential Data Set:
Name . . .                'SYS1.PROCLIB(MQANGEL)'
Volume Serial . . .       (If not cataloged)

Data Set Password . . .   (If password protected)

To Data Set Options:
Sequential Disposition    Pack Option    SCLM Setting
 1 1. Mod                 3 1. Yes        3 1. SCLM
 2 2. Old                 2 2. No         2 2. Non-SCLM

Command ==>

MA A A 14/048
```

At the bottom, a status bar indicates: "Connected to remote server/host clone15mq1 using lu/pool MQS1TC00 and port 23"

11. Repeat this copying process for 'ZQS1.MQ.WEB.JCL(MQWEBS)'
12. Excellent! Now both MQANGEL and MQWEBS will be included in the SYS1.PROCLIB. You can navigate to SYS1.PROCLIB using 3.4 if you'd like to confirm!
13. Now, head over to /var/mqm/ directory from option 3.4 in ISPF, you should be able to see a 'servers' directory has been created. In the servers directory, you will see several XML files. We will modify these files.
14. You can browse the servers by placing a 'l' to the left of the 'servers' option to see its contents. Repeat for 'mqweb' directory until you see several XML files.
15. You can modify the files by using option 'ea' or 'EDIT ASCII' to open the XML file in edit mode. Use

The screenshot shows the MQS1 utility window with the following content:

```
File Edit Settings View Communication Actions Window Help
Menu Utilities View Options Help

Help

P EDIT Entry Panel
E
C Object Name: /MQS1/var/mqm/servers/mqweb/mqwebuser.xml
- Initial Macro . . .
  Profile Name . . . (Blank defaults to Type)
  Format Name . . .
  Panel Name . . . (Leave blank for default)
  Record Length . . .
  Line Command Table . . .

Options Data Encoding
- Confirm Cancel/Move/Replace 1 1. ASCII
- EDIT Mixed Mode 2. UTF-8
- Preserve VB record length
- Warn on First Data Change

F1=Help F2=Split F3=Exit F7=Backward F8=Forward
F9=Swap F12=Cancel

*DSLIST
MA A 09/027
```

At the bottom, a status bar indicates: "Connected to remote server/host clone15mq1 using lu/pool MQS1TC00 and port 23"

'ea' on mqwebuser.xml

16. Once in edit mode, you will want to make the following additions to your XML file. I recommend using copy and paste here, clearing out the old text and put in new text below.

Sample mqwebuser.xml:

```
<?xml version="1.0" encoding="UTF-8"?>
<server>
  <featureManager>
    <feature>appSecurity-2.0</feature>
  </featureManager>
  <webAppSecurity allowFailOverToBasicAuth="true"/>
  <variable name="httpsPort" value="9443"/>
  <variable name="httpHost" value="-1"/>
  <variable name="mqRestMessagingEnabled" value="true"/>
  <httpEndpoint host="*" httpPort="-1" httpsPost="9443"
    id="defaultHttpEndpoint"/>
</server>
```

17. Save the XML file and back out. Now, let's edit the sever.xml. Make the following adjustments by adding the line in red:

Sample server.xml:

```
<server>

  <include location="${wlp.install.dir}/mq/etc/mqweb.xml"/>

  <include location="mqwebuser.xml"/>

  <include location="basic_registry.xml"/>

</server>
```

18. As you can see, we added a reference to basic\_registry.xml file, but we do not have one currently. Let's change that.
19. Let's pull over a sample from the MQ installation configuration. it's going to be located at /usr/lpp/mqm/V9RXXMX/web/mq/samp/configuration. Navigate there using 3.4 from the ISPF menu.
20. Now, type in 'tso omvs' into your command line.
21. Once in OMVS, type in 'ls /usr/lpp/mqm/V9RXXMX/web/mq/samp/configuration'. When you hit enter, you should see a list of the XML files in the directory, including basic\_registry.xml.

```
DQUINCY: /Z31RE1/usr/lpp/mqm/V9RXXMX/web/mq/samp/configuration: >ls
basic_registry.xml      no_security.xml
ldap_registry.xml       zos_saf_registry.xml
```

22. We want that basic\_registry in our servers directory! Now, execute

```
cd /var/mqm/servers/mqweb
```

23. Then execute

```
cp /usr/lpp/mqm/V9RXXMX/web/mq/samp/configuration/basic_registry.xml .
```

24. Nice! We have now copied the basic registry file to our web console set up. Run an 'ls' to confirm.



25. Enter 'exit' to quit out of OMVS. Now, if you back out of the /MQS1/var/mqm/servers/mqweb directory and re-enter it, you will see the basic registry file. Browse it using 'va' to look at what credentials users will be able to use for the web console, make note of the mqadmin username and password. You will need those later.

```

Menu Utilities View Options Help
z/OS UNIX Directory List Row 1 to 10 of 10
Pathname . : /MQS1/var/mqm/servers/mqweb
EUID . . . : 91
Command  Filename      Message      Type Permission Audit  Ext  Fmat
-----
.         Dir      rwxrwxrwx   fff--
..        Dir      rwxrwxrwx   fff--
apps      Dir      rwxrwxrwx   fff--
va_ basic_registry. File  rw-r--r--   fff-- --s-
dropins   Dir      rwxrwxrwx   fff--
jvm.options File  rw-r--r--   fff-- --s-
lib       Dir      rwxrwxrwx   fff--
mqwebuser.xml File  rw-r--r--   fff-- --s-
server.env File  rw-r--r--   fff-- --s-
server.xml File  rw-r--r--   fff-- --s-
***** Bottom of data *****
```

```

/MQS1/var/mqm/servers/mqweb/basic_registry.xml Columns 00001 00072
Sample Basic Registry
-->
<basicRegistry id="basic" realm="defaultRealm">
  <!--
    This sample defines two users with unencoded passwords
    and a group, these are used by the role mappings above.
  -->
  <user name="mqadmin" password="mqadmin"/>
  <user name="mqreader" password="mqreader"/>
  <user name="mftadmin" password="mftadmin"/>
  <user name="mftreader" password="mftreader"/>
  <group name="MQWebAdminGroup">
    <member name="mqadmin"/>
  </group>
</basicRegistry>

<!--
Enable HTTPS on a specific port by uncommenting the line below and p
-->
```

26. You are all configured! Now, lets start up the console! From the ISPF main menu, enter in 'sdsf' and hit enter. You will see a new menu popup and you want to enter in a '/' and hit enter in the command line.

```

. . . . .
Display Filter View Print Options Search Help
-----
SDSF MENU 3.1      MQPLEX1  MQS1                      LINE 1-19 (94)
NP  NAME          Description                          Group      Status
   DA            Active users                          Jobs
   I             Input queue                          Jobs
   O             Output queue                          Output
   H             Held output queue                     Output
   ST            Status of jobs                        Jobs
   JG            Job groups                            JES
   SYM           System symbols                       System
   LOG           System log                            Log
   SR            System requests                      Log
   MAS           Members in the MAS                    JES
   JC            Job classes                           JES
   SE            Scheduling environments               WLM
   RES           WLM resources                        WLM
   ENC           Enclaves                             WLM
   PS            Processes                             OMVS
   SYS           System information                   System
   ENQ           Enqueues                             System
   ENQC          Enqueue contention                   System
COMMAND INPUT ==> /
SCROLL ==> CSR

```

27. A command window will pop up and you can enter the command 's mqwebs' to start the web console.
28. If you navigate to 'DA' from the SDSF main menu, you will see 'MQWEBS' is now running!

```

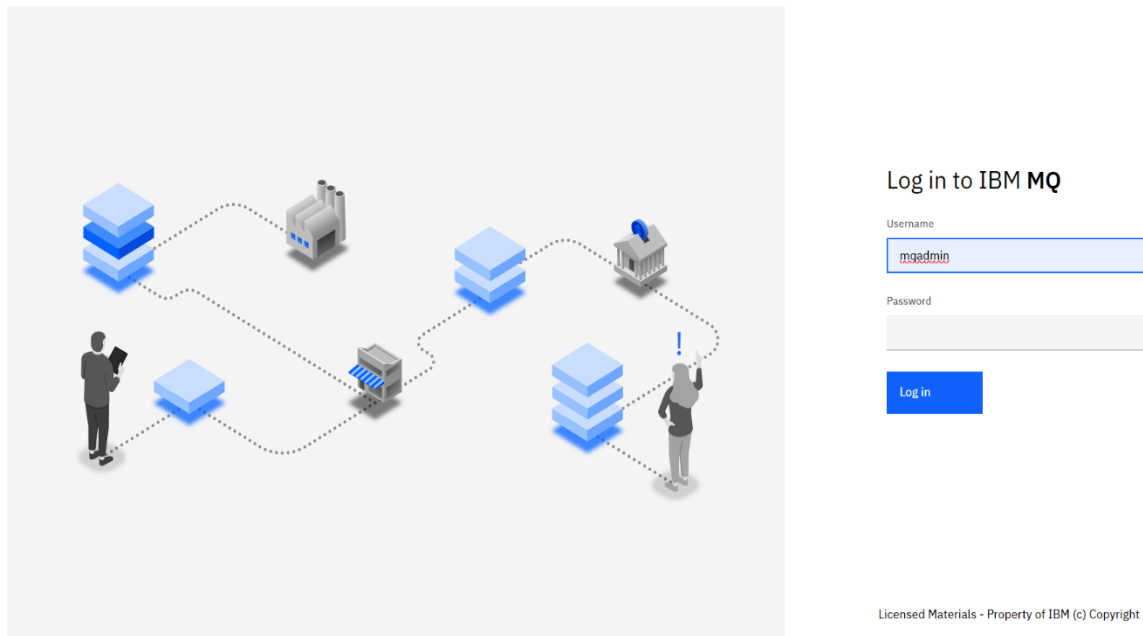
. . . . .
Display Filter View Print Options Search Help
-----
SDSF DA MQS1      MQS1      PAG 0 CPU 3              LINE 1-2 (2)
NP  JOBNAME      StepName  ProcStep  JobID   Owner   C Pos DP Real Paging  SIO
   MQS1CICS      MQS1CICS  CICS     STC00107 CICSSTC NS FE 25T 0.00 0.00
   MQWEBS        MQWEBS    MQCONSOL STC00132 SYSPROG IN FE 79T 0.00 199.58
COMMAND INPUT ==> prefix mq*
SCROLL ==> CSR

```

29. Open a browser in your virtual machine, we recommend chrome and go to the following web address:

<https://cloneXmq1:9443/ibmmq/console> where X is your lab assigned z/OS environment

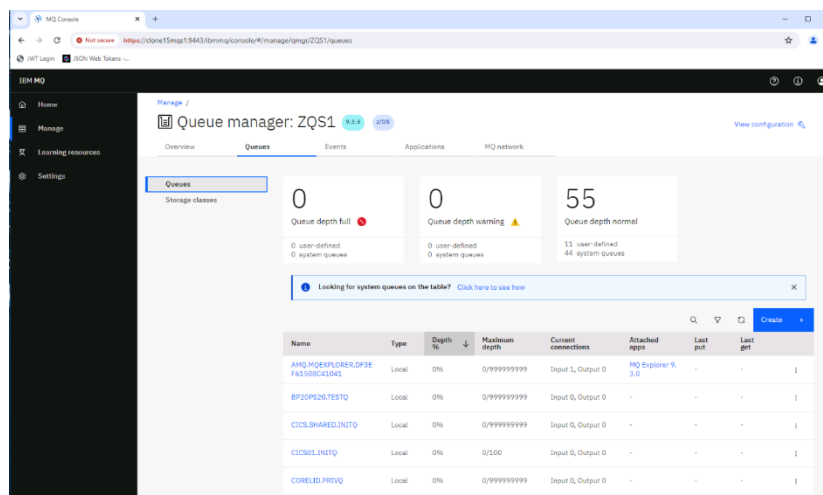
30. A screen like this should pop up. Use the credentials you saw in the basic\_registry.xml to login (hint! Username: mqadmin, password: mqadmin)



31. You may notice when you get inside no queue managers running, if that's the case, go back to your z/OS environment and from the sdsf command shell, enter the commands:

```
ZQS1 START QMGR
ZQS1 START CHINIT
ZQS3 START QMGR
ZQS3 START CHINIT
```

32. When you go back to the console, you should now see queue managers! Feel free to investigate the environment, paying attention to all the MQ objects you can interact with via the console.



33. Try and challenge yourself by finding out the name of the queue sharing group ZQS1 and ZQS3 are involved in

Name of Queue Sharing Group:

34. Lab complete!

### Appendix and Gotcha's:

-Troubleshoot using the 'ST' function of SDSF, you may have a JCL error with MQWEBS if the console doesn't start up with the 's mqwebs' command

-You can take down the console by using the command 'p mqwebs' from the SDSF command shell

Troubleshoot any errors in the MQ web console itself by using the logs provided by the liberty server.

Menu Utilities View Options Help							
z/OS UNIX Directory List						Row 1 to 8 of 8	
Pathname . : /MQS1/var/mqm/servers/mqweb/logs							
EUID . . . : 91							
Command	Filename	Message	Type	Permission	Audit	Ext	Fmat
-----							
	.		Dir	rw-rw---	fff---		----
	..		Dir	rw-rw-rw-	fff---		----
	messages.log	Viewed	File	rw-rw----	fff---	--s-	----
	messages_24.06.		File	rw-rw----	fff---	--s-	----
	state		Dir	rw-rw---	fff---		----
	status.xml		File	rw-rw----	fff---	--s-	----
	trace.log	Viewed	File	rw-rw----	fff---	--s-	----
	trace_24.06.14_		File	rw-rw----	fff---	--s-	----
***** Bottom of data *****							

- You need to create the SYSTEM.REST.REPLY.QUEUE in order to use the Liberty server. Do this by using the latest **CSQ4INSG** sample in your MQ\*.SCSQQPROC