

CBSA Installation Instructions – April 2022

Key: **BLUE** = Location on the mainframe
 YELLOW = Location in the GitHub repo
 GREEN = Existing location in USS

Set up libraries on the host machine and downloading data into them from GitHub:

The GitHub repo is on Enterprise GitHub and is called:

<https://github.ibm.com/IBMZSoftware/CICS-Bank-Sample-Application>

NOTE: CBSA V3 should be fully installed from scratch, and it replaces V2 or any previously installed CBSA instances (note there is no upgrade path between CBSA V2 and V3).

It is our intention to provide Ansible Playbooks to aid installation (for anyone wanting to install in this way). This will get added in due course.

Assumptions:

For Project Nazare, the supplied jobs should install straight into a zTrial environment. If you are not part of project Nazare and wish to install CBSA into your own environment, you may have to perform a small amount of tailoring in some of the jobs.

We have made some assumptions within this document, these are:

- a. That a CICS region and the underlying libraries for that region are already installed in the host environment. Within this document, our CICS region on our test machine is called **CICSTS56**.
- b. That a Db2 subsystem will be available in the host environment i.e. we will refer to the Db2 subsystem as **DBC**.
- c. That there is already a zOS Connect EE Server installed. For the sake of illustration, ours is installed in USS at:

/var/zosconnect/v3r0/servers/defaultServer/resources/zosconnect

(if you are installing outside of project Nazare, this may be a different location in USS).

NOTE 1 – This installation will replace the ‘default’ zOS Connect EE **server.xml** with one which utilises the port numbers 30701 (HTTP) and 30702 (HTTPS) should these port numbers not be appropriate in your host environment then they may be changed in the **server.xml** member in the **/zoseeserver** folder.

NOTE 2 – The last line in **server.xml** references the connection between the z/OS Connect EE server and the CICSTS56 CICS system and it utilises port 30709:

```
<zoscconnect_cicsIpicConnection id="cicsConn" host="localhost" port="30709" />
```

If this port number needs to be changed you will need to edit the server.xml in `/zoseeserver` and you will also need to edit the TCPIP Service definition ZOSEE, in member BANK in folder `/jclInstall`, to reflect the amended port number.

```

.  BROWSE      CBSA.JCL.INSTALL(BANK) - 01.01          Line 0000000637 Col 001 080
.  Command ==>                                     Scroll ==> CSR
.
.  DEFINE TCIPSERVICE(ZOSEE) GROUP(BANK)
.  DESCRIPTION(ZOS CONNECT EE TCPIPS)
.  PORTNUMBER(30709)
.  PROTOCOL(IPIC)
.  URM(DFHISAIP)
.  TRANSACTION(CISS)
.  SSL(NO)
.  SOCKETCLOSE(NO)
.  MAXPERSIST(NO)
.  BACKLOG(00000)
.

```

Installation instructions:

1. First, pull down, from Git Hub, the contents of the `/jclInstall` folder, on to your host machine (it needs to be put into a Library called `CBSA.JCL.INSTALL`).

This contains a set of jobs, which are used to create the necessary libraries and perform necessary set up.

2. Execute job `CBSA.JCL.INSTALL (CRELIBS)`.

This job creates the following additional PDSE/LIBRARYs on the zTrial/host machine (which are all required later on):

<u>PDSE/LIBRARY:</u>	<u>Description:</u>
<code>CBSA.DB2.JCL.INSTALL</code>	– contains JCL jobs to set up DB2.
<code>CBSA.CICSBSA.BUILDJCL</code>	– contains the jobs (JCL) to compile all of the source code in CBSA.
<code>CBSA.CICSBSA.COPYLIB</code>	– contains the COPYBOOK members pulled into the SOURCE code.
<code>CBSA.CICSBSA.LOADLIB</code>	– contains the LOAD modules used by the CICSTS56 CICS region (these modules are created later during compilation).
<code>CBSA.CICSBSA.DBRM</code>	– contains the Db2 DBRM modules (which are generated by the bind).
<code>CBSA.CICSBSA.LKED</code>	– contains the Link Edit source entries.
<code>CBSA.CICSBSA.BMS</code>	– contains the BMS (map) source code modules

CBSA.CICSBSA.ASM	– contains Assembler source modules required to assemble DFHNCOPT
CBSA.CICSBSA.CBSAMOD	– contains the output from the COBOL compilation
CBSA.CICSBSA.COBOLE	– contains the COBOL source code
CBSA.CICSBSA.DSECT	– The copylib that is used by installation compile jobs (i.e. not DBB compile. This folder contains Mapset DSECTs)
CBSA.CICSBSA.REORG	– contains the JCL for reorganising and changing the Db2 tables.

3. Once the [CBSA.JCL.INSTALL\(CRELIBS\)](#) job has completed and has created the above libraries, it will be necessary to pull down the content from the following GitHub folders into each respective library on zTrial.

Git Hub folder content	->	zTrial LIBRARY
/Db2_jcl_install		CBSA.DB2.JCL.INSTALL
/buildjcl		CBSA.CICSBSA.BUILDJCL
/copylib		CBSA.CICSBSA.COPYLIB
/linkedit		CBSA.CICSBSA.LKED
/bms		CBSA.CICSBSA.BMS
/asm		CBSA.CICSBSA.ASM
/cobol_before		CBSA.CICSBSA.COBOLE
/reorg		CBSA.CICSBSA.REORG
/dsect_before		CBSA.CICSBSA.DSECT

Git Hub folder content	->	USS location
/aarfiles		Copy all members/files from /aarfiles into USS at /var/zosconnect/v3r0/servers/defaultServer/resources/zosconnect/apis/ (note - if your zOS Connect EE server runs from a different location in USS, copy the content of the /aarfiles folder into the location of your ownresource/zosconnect/apis folder)

/sarfiles

Copy all members/files from /sarfiles into USS at
/var/zosconnect/v3r0/servers/defaultServer/
resources/zosconnect/services/

(note - if your zOS Connect EE server runs from a different location in USS, copy the content of the /sarfiles folder into the location of your own .../resource/zosconnect/services folder)

Git Hub folder content

->

USS location

/zoseeserver

This contains one member/file, the amended **server.xml** for the z/os Connect EE server. For project Nazare this needs to be copied over the top of the existing server.xml in USS (i.e. this completely replaces the existing server.xml) at location:

/var/zosconnect/v3r0/servers/defaultServer

(note - if installing into your own host environment (outside of project Nazare) you may wish to review the content of the **server.xml** and either replace it or merge it with your own server.xml)

Setting up the Db2 artefacts (STORGROUPS, TABLESPACES, TABLES, INDEXES):

The following creates the ACCOUNT, PROCTRAN and CONTROL table Db2 artefacts (The CONTROL table is utilised to store the last number in use).

1. Execute job CBSA.DB2.JCL.INSTALL(INSTDB2). This creates the Db2 artefacts e.g. STORGROUPS, TABLESPACES, TABLES and INDEXES (note at this time the ACCOUNT, PROCTRAN and CONTROL tables have no data on them yet).

Compile and BIND the source code modules:

1. Execute job CBSA.CICSBSA.BUILDJCL(COMPALL) to compile all of the source code.
2. Execute job CBSA.DB2.JCL.INSTALL(DB2BIND) to BIND the programs to Db2.

Create the VSAM files and populate the Db2 tables with data:

1. Execute job CBSA.JCL.INSTALL(BANKDATA) to create the ABNDFILE and CUSTOMER VSAM files and to execute program BANKDATA which populates the ACCOUNT and CONTROL Db2 tables with data (note the PROCTRAN table has no data in it to start with).

Set up the CICS region, SIT parms and the DFHCSD used to contain all of the CBSA definitions:

1. Execute job `CBSA.JCL.INSTALL(REPLCICS)`. This copies member `CBSA.JCL.INSTALL(CICSTS56)` to `FEU.Z24C.PROCLIB(CICSTS56)` it is meant to replace/overwrite the provided CICS start up procedure (of the same name) in `FEU.Z24C.PROCLIB`. This sets up the correct DB2 libraries in `STEPLIB` and puts the CBSA load module into the `DFHRPL`.

If you are installing into your own host environment (outside of project Nazare) you may wish to review the content of member `CICSTS56` and apply the relevant parts to your own CICS region startup procedure or startup JCL.

2. Execute job `CBSA.JCL.INSTALL(REPLSIP)`. This copies member `CBSA.JCL.INSTALL(DFHESIP1)` to `DFH560.SYSIN(DFHESIP1)` it is meant to replace/overwrite the provided module (of the same name) in `DFH560.SYSIN`. This will setup the correct SIT parameters (as used by the CICS region) and includes a Db2 connection.

If you are installing into your own host environment (outside of project Nazare) you may wish to review the content of member `DFHESIP1` and apply the relevant parts to your own SIT parameters.

3. Execute job `CBSA.JCL.INSTALL(HBANKCSD)` to update the DFHCSD with the CBSA definitions and add the CSD GROUP(BANK) into a LIST called `CICSTS56` (which is used in the SIT parms for the CICS region).

Make RACF and USS security changes

If you are installing into your own host environment (outside of project Nazare) you may wish to review the content of members `RACF001` and `ZOSCSEC` and apply the relevant parts to your own environment.

1. Execute job `CBSA.JCL.INSTALL(RACF001)`. This makes the RACF changes to ensure that the new IBMUSER controlled CICS region has access to everything when it restarts (in particular the Db2 sub system, since we have added `DB2CONN` into the SIT parm previously).

2. Execute job `CBSA.JCL.INSTALL(ZOSCSEC)`. This makes the security change to ensure that the APIs and Services for the RestFul APIs, used by zOS Connect EE, have the correct access when the z/OS Connect EE server is restarted later on.

Stop and Restart the CICS region.

In order to pick up the changes to the SIT parms and the new CSD definitions for CBSA, it is necessary to stop and restart the `CICSTS56` CICS region (the CICS region being utilised is defined with **START=INITIAL** coded in the SIT, so restarting CICS pulls in all of the above changes).

1. Execute job `CBSA.JCL.INSTALL(ShutCICS)` to close down the CICS system (`CICSTS56`).

2. Execute job `CBSA.JCL.INSTALL(RESTCICS)` to start up `CICSTS56` (this time pulling in the SIT parm amendments etc.).

Stop and Restart the z/OS Connect EE Server.

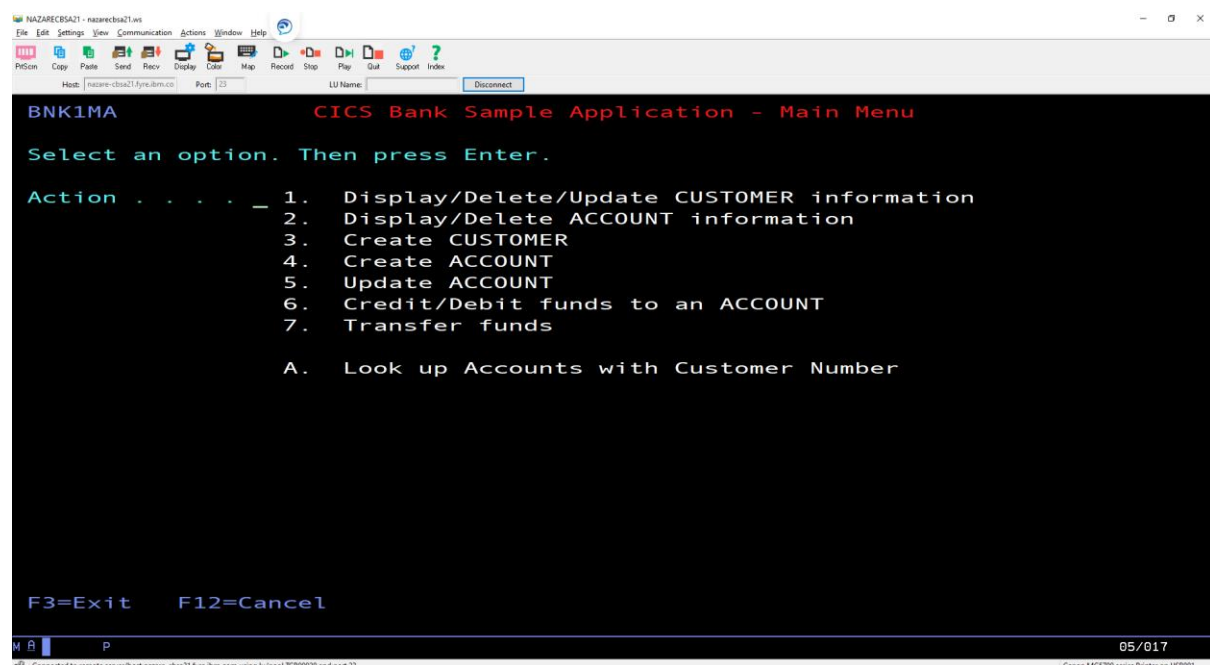
In order to pick up the changes to the z/OS Connect EE Server (which may already be running):

1. Execute job `CBSA.JCL.INSTALL(SHUTZOSC)` to close down the z/OS Connect EE server.
2. Execute job `CBSA.JCL.INSTALL(RESTZOSC)` to restart the z/OS Connect EE server.

Validating that the installation has worked:

Checking the CUSTOMER VSAM KSDS:

1. Logon to CICSTS56 (with the IBMUSER supplied USER ID), Clear the screen, Type OMEN and you should be presented with the CBSA MAIN MENU:



The screenshot shows a terminal window titled "NAZARECBSA21 - nazarecbsa21.ms". The window displays the "CICS Bank Sample Application - Main Menu". The menu text is as follows:

```
BNK1MA                                CICS Bank Sample Application - Main Menu
Select an option. Then press Enter.

Action . . . . . 1. Display/Delete/Update CUSTOMER information
                  2. Display/Delete ACCOUNT information
                  3. Create CUSTOMER
                  4. Create ACCOUNT
                  5. Update ACCOUNT
                  6. Credit/Debit funds to an ACCOUNT
                  7. Transfer funds

                  A. Look up Accounts with Customer Number

F3=Exit   F12=Cancel
```

The terminal window also shows a status bar at the bottom with the text "05/017" and "Connected to remote server/host nazare-cbsa21.fyre.ibm.com using lu/pool TCP00000 and port 23".

2. Select option 1 (Display/Delete/Update CUSTOMER information) from the main menu:

```
BNK1MA          CICS Bank Sample Application - Main Menu

Select an option. Then press Enter.

Action . . . . 1.  Display/Delete/Update CUSTOMER information
                  2.  Display/Delete ACCOUNT information
                  3.  Create CUSTOMER
                  4.  Create ACCOUNT
                  5.  Update ACCOUNT
                  6.  Credit/Debit funds to an ACCOUNT
                  7.  Transfer funds
                  <  A.  Look up Accounts with Customer Number  >

F3=Exit  F12=Cancel
```

Then enter a Customer Number:

```
BNK1DC          CICS Bank Sample Application - Display Customer.

Provide a CUSTOMER number. Then press Enter.

CUSTOMER NUMBER 1234

Sort Code
Customer Number
Customer Name
Customer Address

Customer D.O.B.      /      /
Credit Score
CS Review Date      /      /      -

F3=Exit  F12=Cancel
```

If all is well, the details for that particular customer should be returned:

```
BNK1DC          CICS Bank Sample Application - Display Customer.

Provide a CUSTOMER number. Then press Enter.

CUSTOMER NUMBER 0000001234

Sort Code      987654
Customer Number 0000001234
Customer Name   Dr Ulrika W Robinson
Customer Address 65 Oak Rise, York

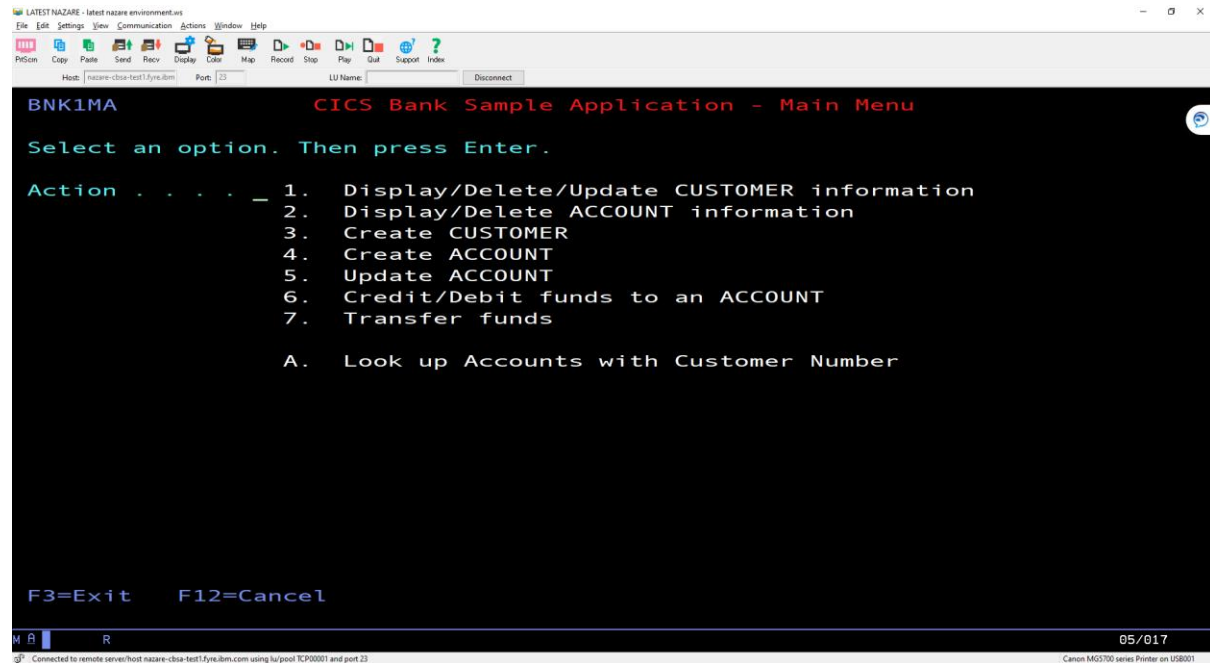
Customer D.O.B. 16 / 04 / 1953      -
Credit Score    057
CS Review Date  26 / 01 / 2021

Customer lookup successful. <PF5> to Delete. <PF10> to Update.
F3=Exit  F12=Cancel
```

(this validates that KSDS data has been loaded correctly).

Checking the ACCOUNT data (Db2):

3. Go back to the CBSA main menu (pf3):



```
BNK1MA                                CICS Bank Sample Application - Main Menu

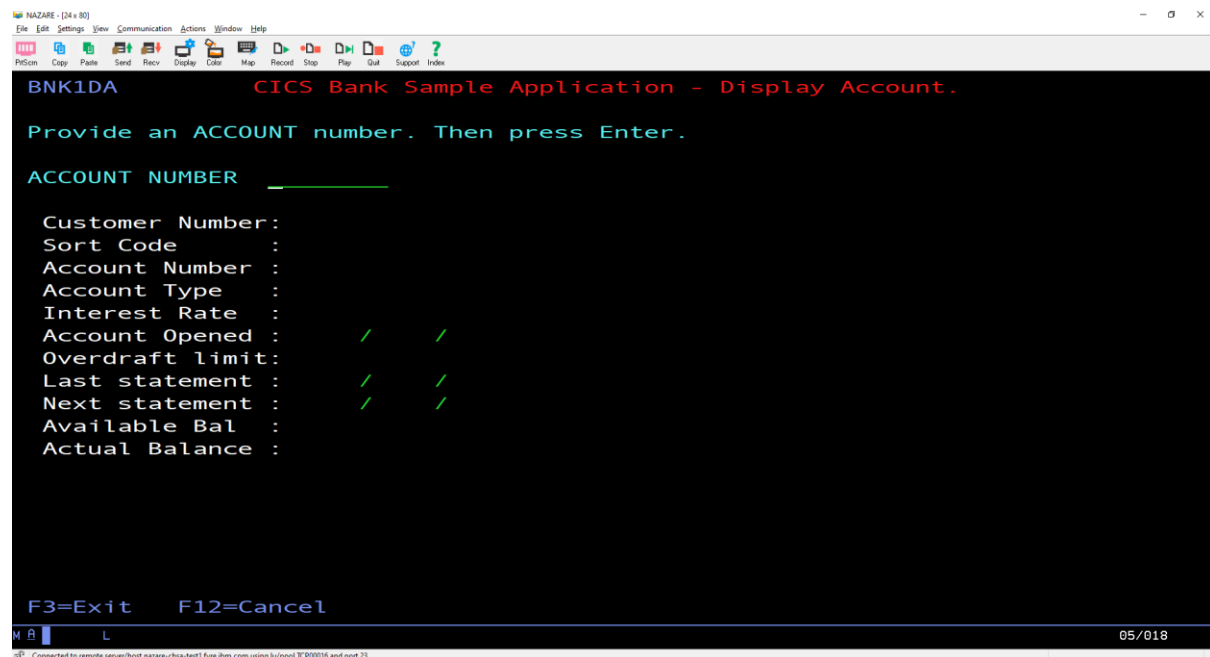
Select an option. Then press Enter.

Action . . . . . 1.  Display/Delete/Update CUSTOMER information
                  2.  Display/Delete ACCOUNT information
                  3.  Create CUSTOMER
                  4.  Create ACCOUNT
                  5.  Update ACCOUNT
                  6.  Credit/Debit funds to an ACCOUNT
                  7.  Transfer funds

                  A.  Look up Accounts with Customer Number

F3=Exit  F12=Cancel
```

And from here select option 2 (Display/Delete ACCOUNT information):



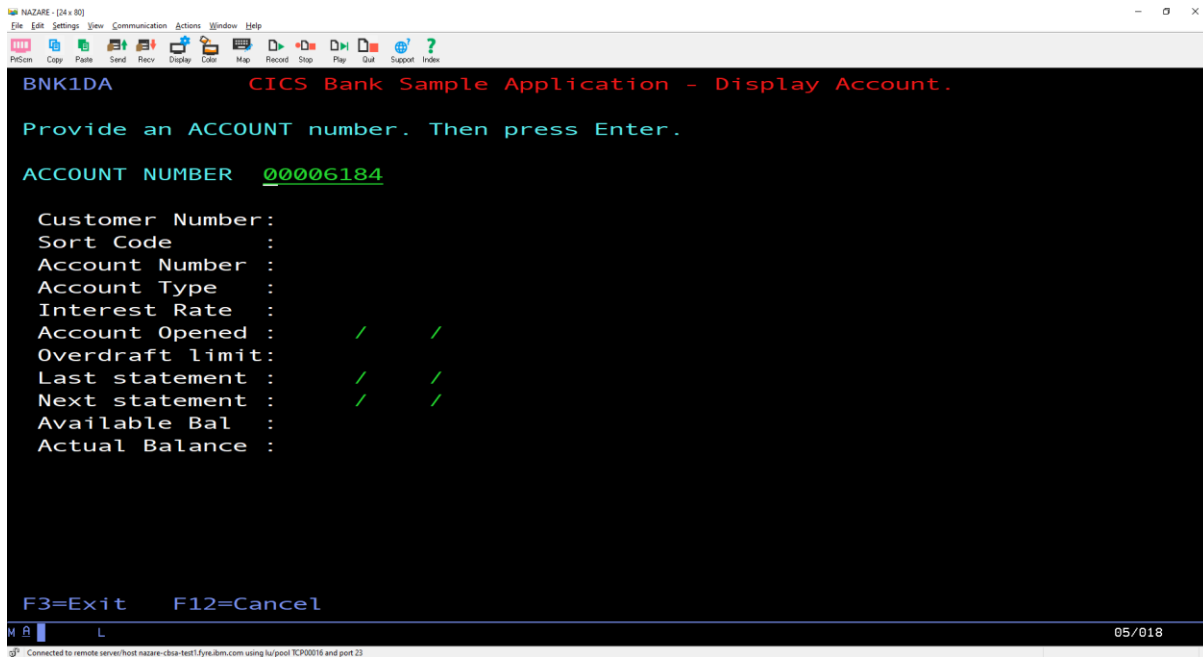
```
BNK1DA                                CICS Bank Sample Application - Display Account.

Provide an ACCOUNT number. Then press Enter.

ACCOUNT NUMBER _____

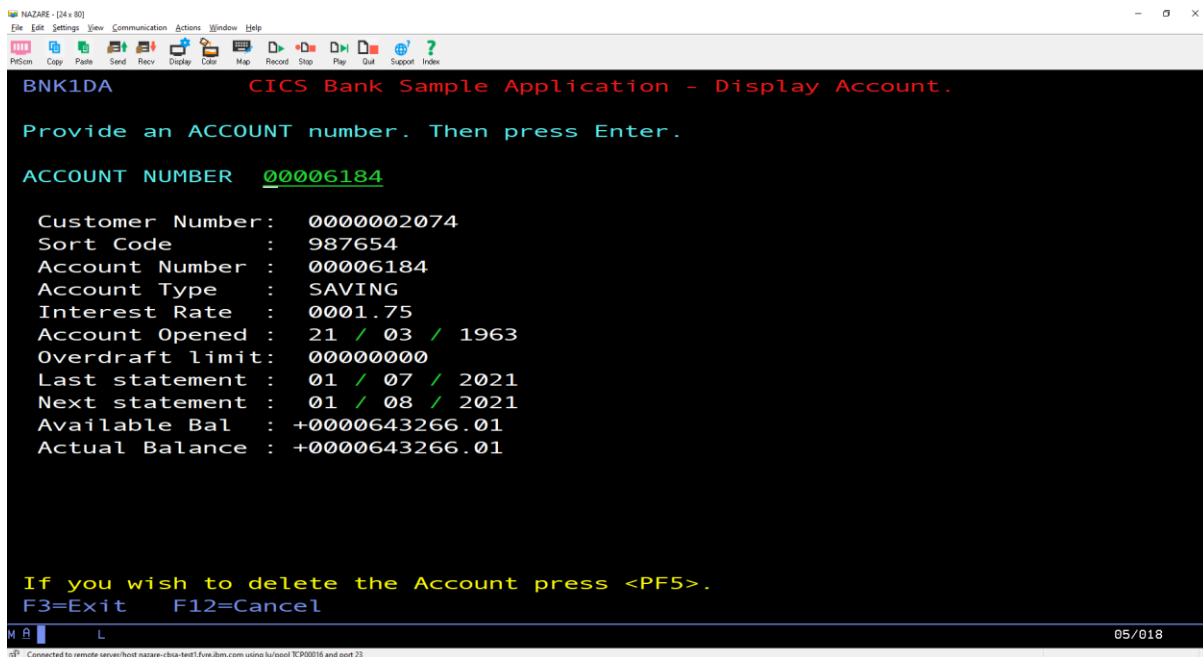
Customer Number:
Sort Code      :
Account Number :
Account Type   :
Interest Rate  :
Account Opened :      /      /
Overdraft Limit:
Last statement :      /      /
Next statement :      /      /
Available Bal  :
Actual Balance :
```


The account number field should be 8 bytes long. Supply an account number, for example:



```
NAZARE - [24 x 80]
File Edit Settings View Communication Actions Window Help
PrtScr Copy Paste Send Recv Display Color Map Record Stop Play Quit Support Index
BNK1DA CICS Bank Sample Application - Display Account.
Provide an ACCOUNT number. Then press Enter.
ACCOUNT NUMBER 00006184
Customer Number:
Sort Code:
Account Number:
Account Type:
Interest Rate:
Account Opened: / /
Overdraft limit:
Last statement: / /
Next statement: / /
Available Bal:
Actual Balance:
F3=Exit F12=Cancel
05/018
Connected to remote server/host nazare-cbsa-test1.fyre.ibm.com using lu/pool TCP00016 and port 23
```

And this should return some data:



```
NAZARE - [24 x 80]
File Edit Settings View Communication Actions Window Help
PrtScr Copy Paste Send Recv Display Color Map Record Stop Play Quit Support Index
BNK1DA CICS Bank Sample Application - Display Account.
Provide an ACCOUNT number. Then press Enter.
ACCOUNT NUMBER 00006184
Customer Number: 0000002074
Sort Code: 987654
Account Number: 00006184
Account Type: SAVING
Interest Rate: 0001.75
Account Opened: 21 / 03 / 1963
Overdraft limit: 00000000
Last statement: 01 / 07 / 2021
Next statement: 01 / 08 / 2021
Available Bal: +0000643266.01
Actual Balance: +0000643266.01
If you wish to delete the Account press <PF5>.
F3=Exit F12=Cancel
05/018
Connected to remote server/host nazare-cbsa-test1.fyre.ibm.com using lu/pool TCP00016 and port 23
```

If data is displayed, this validates that the Db2 ACCOUNT table has been correctly populated.

Checking the zOS Connect EE API:

4. Confirm that the zOS Connect EE server is executing (check this in SDSF (S;DA)) – the job name for the zOS Connect EE server in project Nazare is called **ZOSCSRVR**.

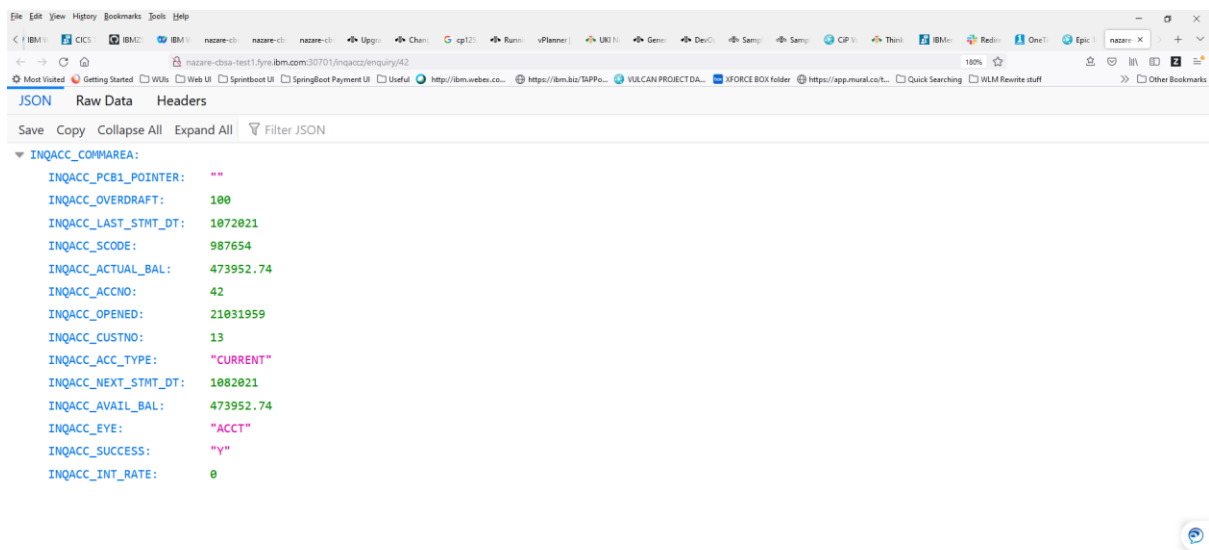
5. Go to a web browser and put in this URL:

<http://your-host-name:your-port-number/inqaccz/enquiry/42>

For project Nazare, replace *your-port-number* with port 30701 in the above URL. You will have been allocated your own zTrial hostname if running as part of project Nazare, and this should replace *your-host-name* in the above URL.

If the zOS Connect EE server is executing outside of the zTrial/Nazare environment, substitute the host name and port number accordingly.

6. This should return something similar to this (enquiry on account 42):



If data is not returned, then check the port number and status of the z/OS Connect EE server. If these are OK, check in the CICS region (using the **CEMT I TCPIPS(ZOSEE)** command) that there is a TCPIP Service called **ZOSEE** and that it has been installed and that the TCPIP Service is Open. You should see something like this:

The screenshot shows a terminal window titled "LATEST NAZARE - latest nazare environment.us". The terminal displays the following text:

```
I TCPIPS (Z0SEE) - OVERTYPE TO MODIFY
STATUS: RESULTS
TcpiPs(Z0SEE ) Ope Por(30709) Ipic Nos Tra(CISS)
Con(00002) Bac( 01024 ) Maxd( 000000 ) Urm( DFHISAIP )
```

At the bottom of the terminal, the following response is shown:

```
RESPONSE: NORMAL
PF 1 HELP 3 END 5 VAR 7 SBH 8 SFH 9 MSG 10 SB 11 SF
```

Additional information at the bottom right of the terminal includes:

```
SYSID=S730 APPLID=CICSTS56
TIME: 10.56.15 DATE: 11/22/21
```

The terminal window also shows a status bar at the bottom indicating the connection to the remote server and the current time.

The above TCPIP Service should be using port 30709 - this is the connection between the zOS Connect EE server and the CICST56 CICS region supplied in zTrial.

Finally, check the zOS Connect EE Server logs to ensure that the API archive files (the aars) and the service archive files (the sars) were all installed successfully and that the server itself is reporting a message similar to this:

The defaultServer server is ready to run a smarter planet. The defaultServer server started in 112.474 seconds.