



Micro Focus Studio™ for Mainframe Migration Developers Workshop

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Micro Focus Studio™ for Mainframe Migration Workshop
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Workshop Table of Contents

Preface	i
Workshop Information	i
Course Outline	iii
How to Use this Book.....	iv
About Micro Focus	vi
How to Contact Us	vi
Module 1 – Creating and configuring the Net Express Project	
Overview	1
Objectives	1
Creating a Net Express project.....	2
Configuring the Net Express project	4
Location of copy files	7
Using PCOMMAIN	8
Populating the Net Express Project	13
Configuring BMS options.....	16
Adding COBOL source	17

Module 2 - Adding database capabilities to the project

Overview	1
Objectives	1
Creating the database environment.....	2
Configuring the SQL Option for DB2.....	2
Configure default location	5
Loading tables.....	7
Configure XDB ODBC driver.....	10

Module 3 – Setting up Enterprise Server

Overview	1
Objectives	1
Add Bankdemo Enterprise Server	2

Module 4 – CICS configuration

Overview	1
Objectives	1
Configure Bankdemo Enterprise Server (CICS).....	2

Module 5 – XA setup

Overview	1
Objectives	1
Configure Bankdemo ES XA resources	2

Module 6 – JCL configuration

Overview	1
Objectives	1
Configure Bankdemo Enterprise Server (JCL)	2
Adding Batch Initiators	6

Module 7 – Working with JCL

Overview	1
Objectives	1
Working with JCL.....	2
Adding JCL to a project.....	2
Associate the project with an enterprise server	3
Submitting JCL.....	4
Viewing the Catalog	5
Viewing the Spool.....	5

Module 8 – Dynamic Debugging

Overview	1
Objectives	1
Using Enterprise Server Dynamic Debugging	2
Animating CICS.....	3
Animating JCL.....	4

Module 9 - Extending existing CICS applications

Overview	1
Objectives	1
Extending migrated CICS applications	2
Identify suitable subroutine	3
Creating a Net Express project	6
Create a new Service Interface.....	8
Creating Operations.....	13
Configure the service deployment.....	22
Deploying the service.....	24
Generating test clients	25

Preface

Workshop Information

Description

In this hands-on workshop, you will gain a working knowledge and degree of proficiency using the **Micro Focus Studio™ for Mainframe Migration** for the maintenance and development of COBOL based applications that have been migrated from an IBM Mainframe for deployment on Windows, UNIX and Linux.

Prerequisites

To get the maximum benefit from this workshop, you must have experience in COBOL programming, IBM CICS™, IBM JCL™, SQL and completed the **Working with Net Express** course.

Audience

The audience for this workshop is COBOL / CICS / JCL / SQL application developers.

Objectives

Upon successful completion of this workshop, you will be able to use the **Micro Focus Studio™ for Mainframe Migration** to:

- Create Net Express projects to support development and maintenance of migrated applications.
- Configure Enterprise Server to use CICS, JCL and SQL
- Extend the migrated application to use Web Services using the Interface Mapping Toolkit.

Duration

The duration of this workshop is two days.

Course Outline

Module 1: Creating and configuring the Net Express Project

- Creating a Net Express project
- Configuring the Net Express project
- Location of copy files
- Using PCOMMAIN
- Populating the Net Express project
- Configuring BMS options
- Adding COBOL source

Module 2: Adding database capabilities to the project

- Creating the database environment
- Configuring the SQL option for DB2
- Configure default location
- Loading tables
- Configure XDB ODBC driver

Module 3: Setting up Enterprise Server

- Add Bankdemo enterprise server

Module 4: CICS configuration

- Configure Bankdemo enterprise server (CICS)

Module 5: XA setup

- Configure Bankdemo ES XA resources

Module 6: JCL configuration

- Configure Bankdemo enterprise server (JCL)
- Adding batch initiators

Module 7: Working with JCL

- Working with JCL
- Adding JCL to a project
- Associate the project with an enterprise server
- Submitting JCL
- Viewing the catalog
- Viewing the spool

Module 8: Dynamic Debugging

- Using Enterprise Server dynamic debugging
- Animating CICS
- Animating JCL

Module 9: Extending existing CICS applications

- Extending migrated CICS applications
- Identify suitable subroutine
- Creating a Net Express project
- Create a new service interface
- Creating operations
- Configure the service deployment
- Deploying the service
- Generating test clients

How to Use this Book

Class Guide

This book contains information to supplement class lectures and demonstrations.

Reference

You can refer back to this book, the guided walkthroughs, and the practical exercises to reinforce your learning and application after class.

Practical Exercises

Exercises are available throughout the workshop to provide practice using the skills necessary to apply what you've learned in class back in your workplace.

Refer to the steps of the guided walkthroughs for greater detail and assistance while working with the exercises.

About Micro Focus

Company Overview

Micro Focus provides innovative software that allows companies to dramatically improve the business value of their enterprise applications. Micro Focus Enterprise Application Modernization and Management software enables customers' business applications to respond rapidly to market changes and embrace modern architectures with reduced cost and risk.

Micro Focus has more than 30 years of expertise and more than 15,000 customers and one million licensed users, including more than 70 of the Fortune Global 100 companies.

Micro Focus offers unsurpassed breadth of platform support, performance and scalability, and the most comprehensive suite of development and integration environments to help customers succeed in taking full advantage of the power of their legacy systems. Founded in 1976, Micro Focus is a global company that employs more than 600 people worldwide, with principal offices in the United Kingdom and United States.

How to Contact Us

Feedback on the Workshop

If you have any feedback or suggestions about this workshop, contact us at:

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Internet

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Module 1

Creating and configuring the Net Express Project

Overview

Net Express is used to maintain the **BankDemo** project. The project properties must then be set up to give the most appropriate environment for maintenance and additional development. Once this has been done, the files of different types can be added.

Objectives

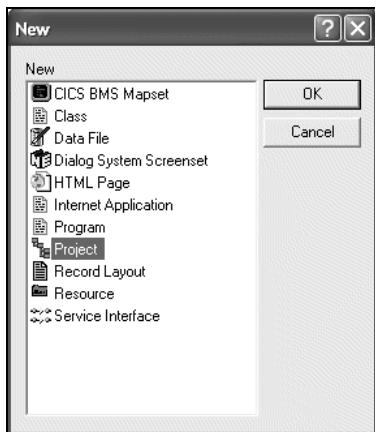
After completing this module, you will be able to:

- Create a new project and configure it to replicate a mainframe style environment.
- Appreciate how directives can be set to simplify the process
- Import and compile all files.

Creating a Net Express Project

- Copy the received directory structure to c:\bankdemo
- Start Net Express.
- Select **File, New**.

Select **Project**:

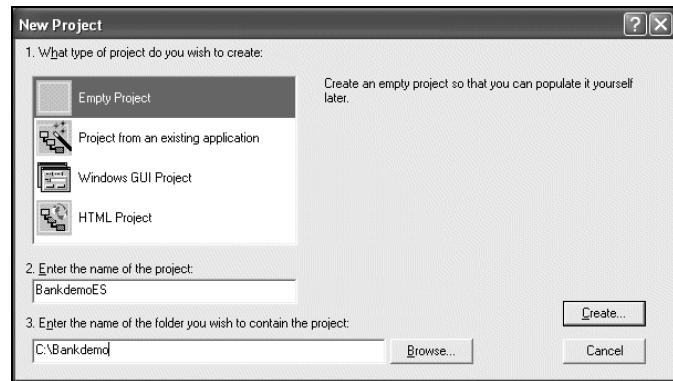


- Click **OK**. The New Project wizard is displayed:

Select Empty Project

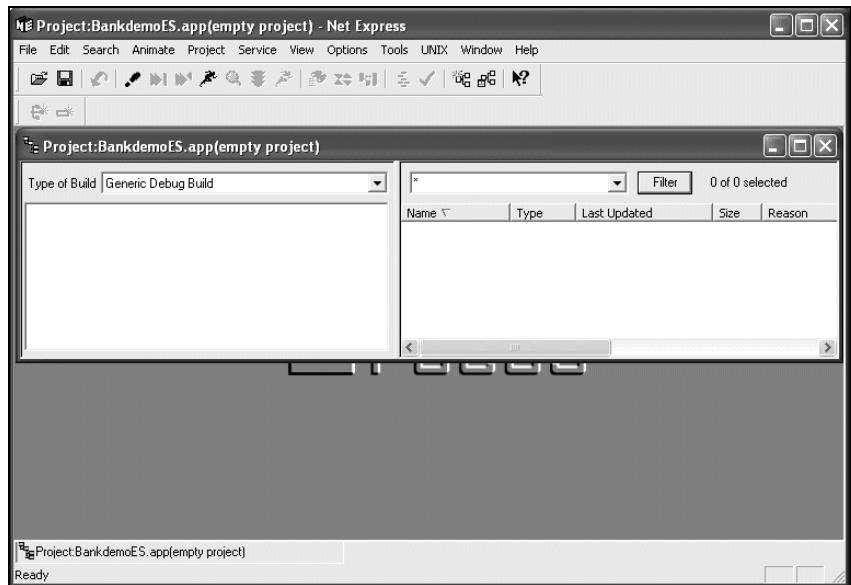
Enter a **name** for your project – **BankdemoES**

Enter the **project** folder – **C:\Bankdemo**



- Click **Create**.

Respond to any additional window prompts as required. When complete, the project window displays.



Configuring the Net Express project

Configuring the project properties

Once the Net Express project is created and before you add any components you need to configure it for your application.

Type of Build

Build types are used to label a specific set of compiler directives and other settings for a build. Each file in your project can have different settings associated with different build types.

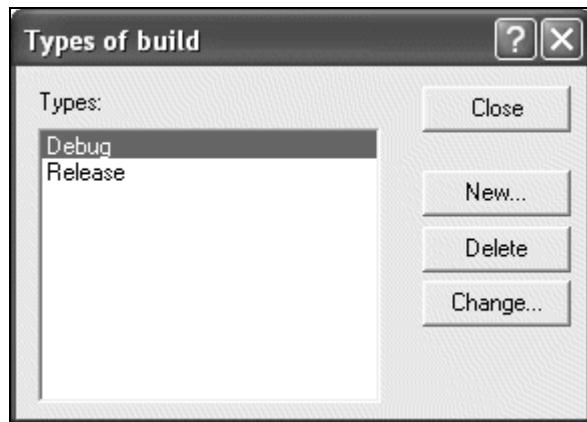
You can specify your own build types and choose what to call them, but two preset build types are provided: Generic Debug Build and Generic Release Build. These are useful 'general purpose' build types. Both have the directive ANIM set by default.

Any changes you make to the build settings of a file in your project are stored in the current build type, and are restored whenever you select that build type again.

Changes made to all files in your project using Properties on the Project menu apply across all build types for that project.

In order to maintain consistency with mainframe style application development, the name of the **Build directory** needs to be changed.

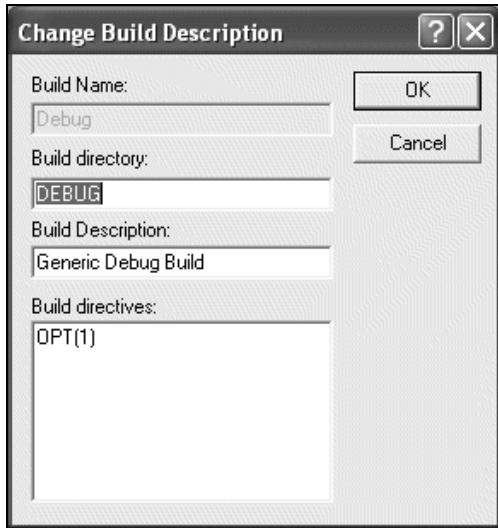
- Select **Project | Types of build ...**



- Highlight the **Release** build type and click **Delete**.
- Highlight the **Debug** build type and click **Change**:

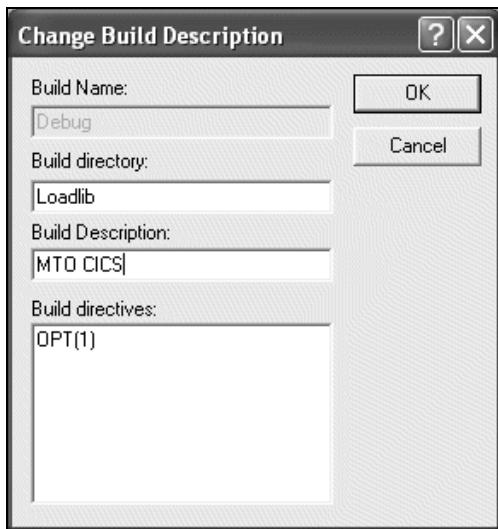


- Change the **Build directory** from Debug to **Loadlib**:



Change the

- Build directory to **LoadLib**
- Build Description to **MTO CICS**:

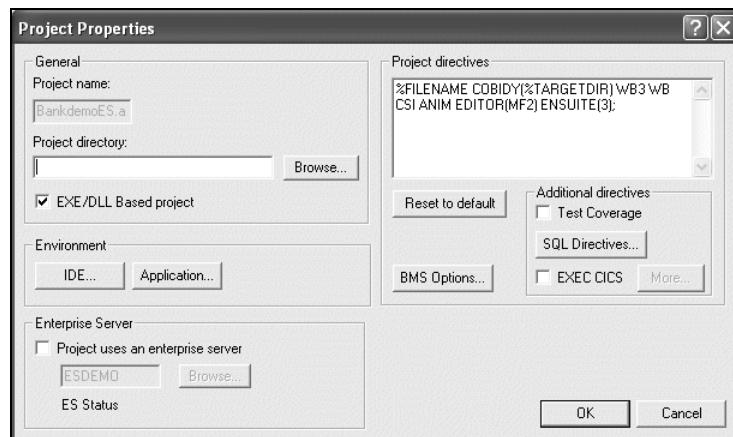


- Click **OK**.

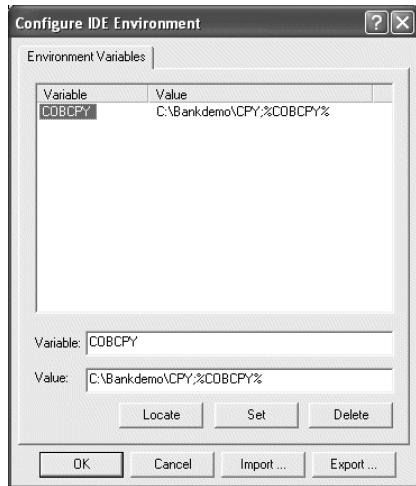
Location of copy files

Usually, copybooks will be located in separated folders or directories (they will not reside in the same directory as the main source programs). You must tell the Compiler where they are, by setting the environment variable COBCPY.

- Select **Project | Properties**
Click **IDE**:



- Set the **COBCPY** environment variable to **C:\Bankdemo\CPY**; and concatenate the value **%COBCPY%** to preserve any existing values that exist prior to starting Net Express.
Click **Set**, followed by **OK**.



Using PCOMMAIN

In order to further minimize the number of configuration changes in the Net Express project, e.g. compiler directives etc, a number of simple configuration options can be handled by the pre-compiler, PCOMMAIN.

Net Express IDE does not parse source code in order to determine whether or not SQL/CICS etc pre-compiler is required. In order to avoid potential user errors when changing program build settings, PCOMMAIN can be used.

PCOMMAIN is a component of **Migration Software Development Kit** (MSDK) and Migration End User Kit (MEUK) AddPacks™.

PCOMMAIN is used in order to parse COBOL sources at compilation time to automatically detect whether a program requires to be preprocessed for SQL or CICS. When enabled, it will detect whether preprocessing is required and set the appropriate compiler directives.

The pre-compiler will create a compiler directives file (*Filename.Dir*) for each source. These directives files will contain *use(dirfiles.dir)* commands.

e.g. If SQL ProgramA is compiled, DIRFOLDER\ProgramA.dir will contain

```
& THIS DIRECTIVE FILE WAS CREATED BY PCOMMAIN $Revision: 1.13 $  
& Default directives  
USE ($DEFAULTDIR\default.dir)  
& DB2 directives  
USE ($DEFAULTDIR\sql.dir)  
& CICS directives  
USE ($DEFAULTDIR\cics.dir)
```

Note: if ProgramA.dir already exists in the folder DIRFOLDER, PCOMMAIN will immediately exit. To force a re-parsing of ProgramA code, you need to delete ProgramA.dir in the folder DIRFOLDER

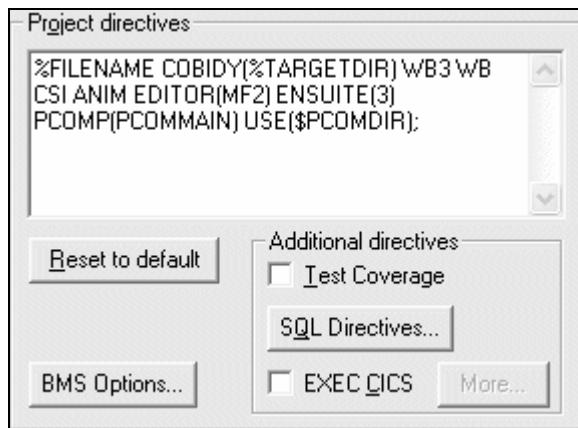
To allow the PCOMMAIN processing 2 environment variables must be created:

DEFAULTDIR	Location of the default dir files (Default.Dir and SQL.DIR...) Sample default dir file are shipped with MSDK and MEUK
DIRFOLDER	Location where all <i>progname.dir</i> files will be created

To enable PCOMMAIN within a Net Express project:

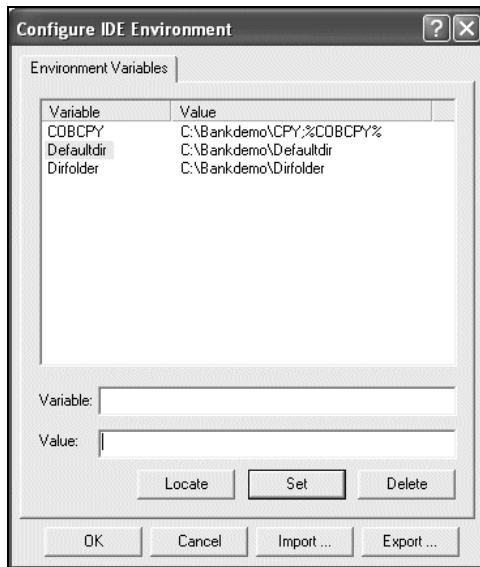
- Select **Project | Properties** and add the following to the Project directives:

PCOMP(PCOMMAIN) USE(\$PCOMDIR)



- Set up PCOMMAIN pre-compiler environment variables:

Select **Project | Properties** and click on **IDE** then **Add** and set the **DefaultDir** and **DirFolder** environment variables as below:



Installation of the MDSK will copy the Default directive files into the NetExpress_Installation_Folder\DefaultDir. This folder and its contents should be copied into your Net Express migration project folder structure. The directives can be customized in order to reflect the requirements of the application being maintained.

The active SQL directives are contained in the SQL.DIR.

To Switch XA connection type simply copy the relevant directives file to SQL.DIR and recompile your sources.

For example to switch directives from DB2 to ODBC, copy ODBC.DIR to SQL.DIR.

Note: Remember to change also XA parameters in the ES configuration.

The following directives files are installed:

Default.DIR	Default COBOL compiler directives
CICS.DIR	Contains directive to enable the CICS preprocessor and any specific directives for the CICS preprocessor
SQL.DIR	Contains directive to enable the SQL preprocessor and any specific directives for the SQL preprocessor. Will be a copy of ODBC.DIR, ORACLE.DIR or UDB.DIR
ODBC.DIR	Contains directive to enable the SQL preprocessor and any specific directives for MS SQL Server
ORACLE.DIR	Contains directive to enable the SQL preprocessor and any specific directives for Oracle
UDB.DIR	Contains directive to enable the SQL preprocessor and any specific directives for UDB

Configure SQL directives

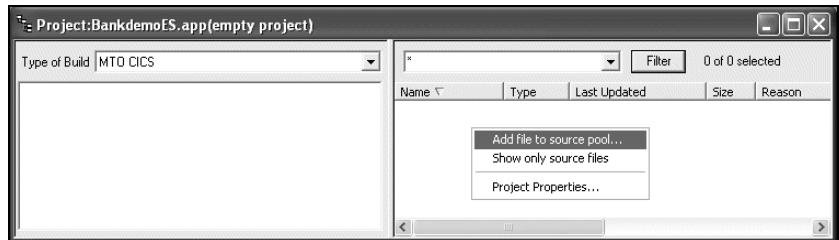
In this project the Micro Focus SQL Option for DB2 is used.

Edit the SQL.DIR to contain only the directive **SQL(DBMAN=ODBC)**

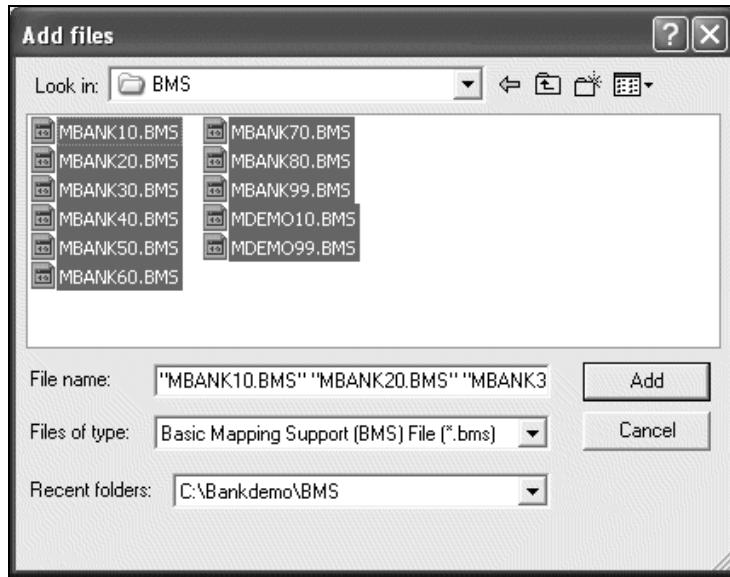
Populating the Net Express project

Adding BMS

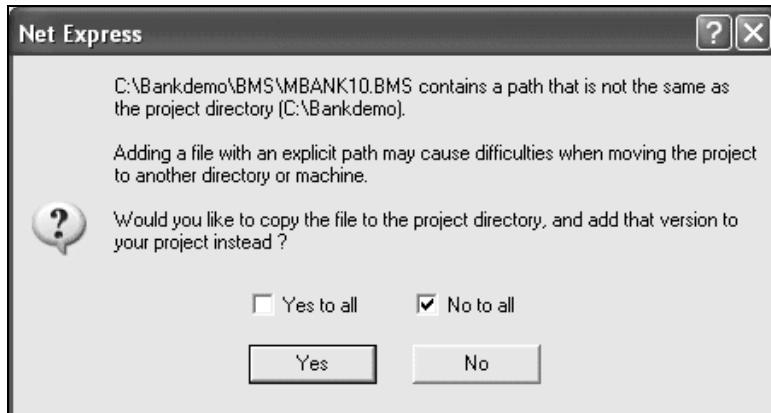
- Right-click in the Source Pool and select Add file to source pool.



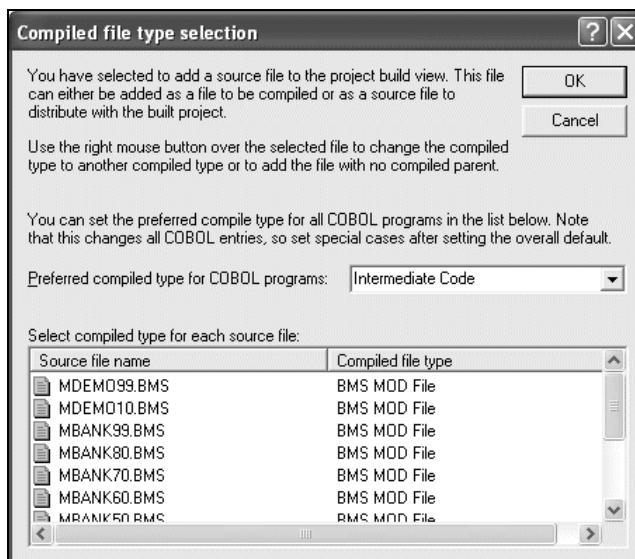
- In the Add Files window, navigate to the folder that contains your files (e.g.:\\Bankdemo\\BMS). Select the desired file(s); press **Add**.



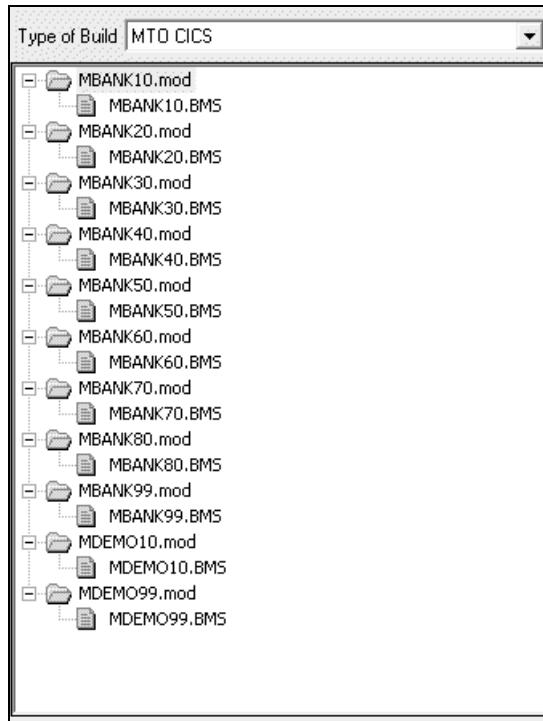
- When adding files to projects, Net Express prompts you if the selected components are not resident in the current Project Folder. A selection screen is displayed to specify the way you want to access source code.
- In this case leave the sources in their original location. Check **No to all** followed by **No**:



- Select all BMS from the Source Pool, drag and drop them to the Project Tree View. Click **OK** to accept the default compilation type:



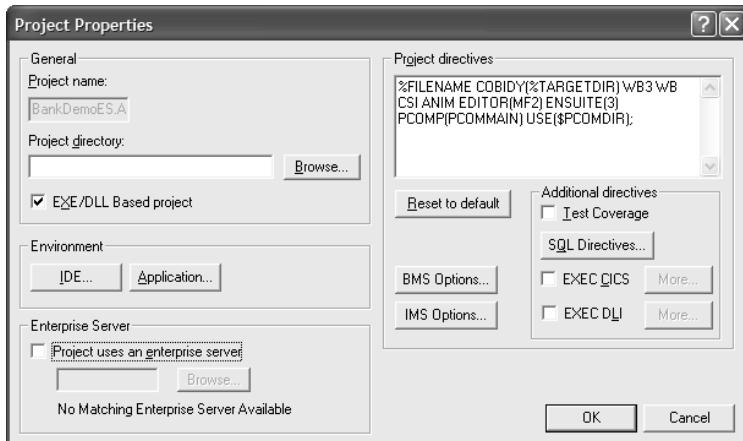
- The Project Tree View hierarchy is updated:



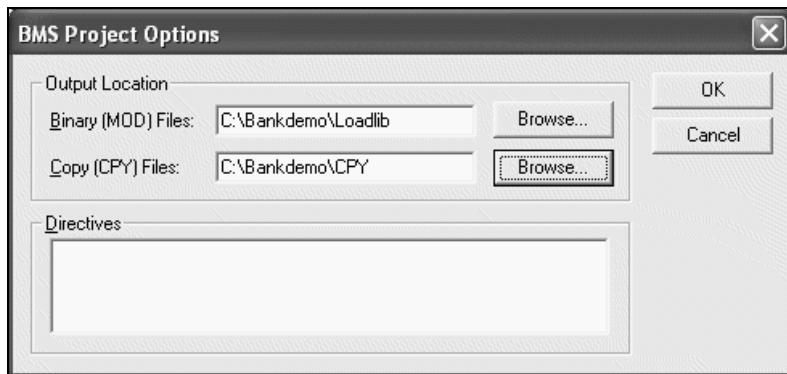
Configuring BMS Options

Directives to handle the generation of copy files and MOD files need to be added.

- Select **Project | Properties:**



- Click **BMS Options.**
- Enter the location for the MOD files: **C:\Bankdemo\Loadlib**.
Enter the location for the copy files: **C:\Bankdemo\CPY**.

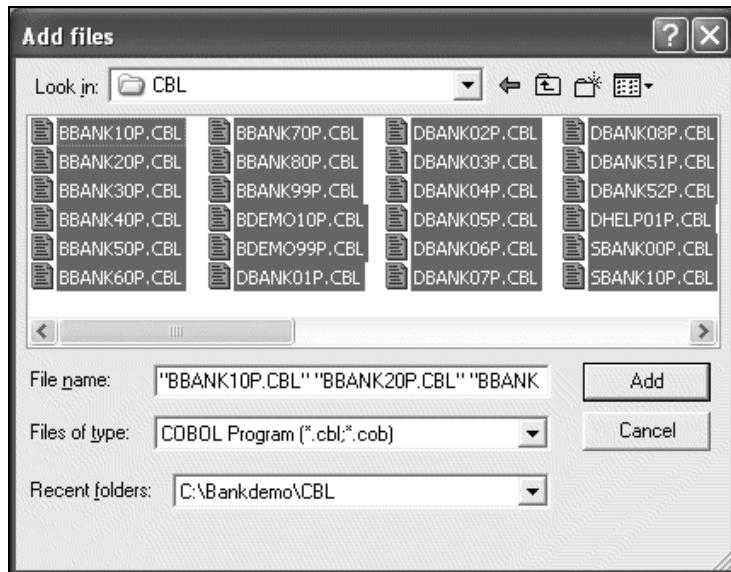


- Click **OK twice.**
- Click on the Rebuild icon and check that there are no errors.

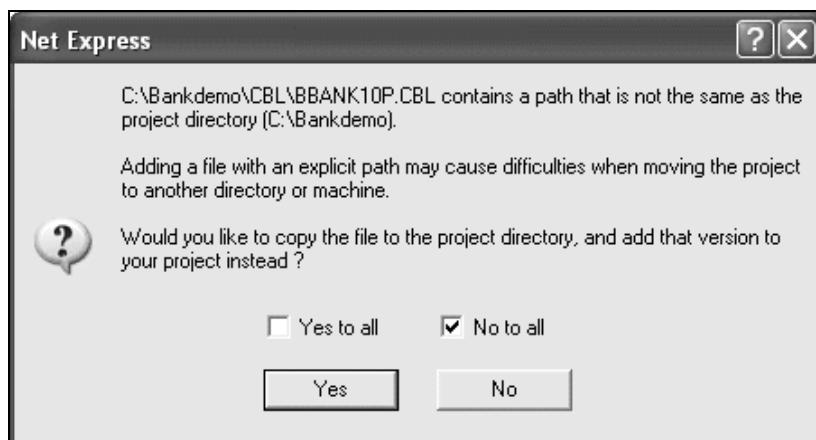
Adding COBOL source

- Right-click in the Source Pool and select Add file to source pool.

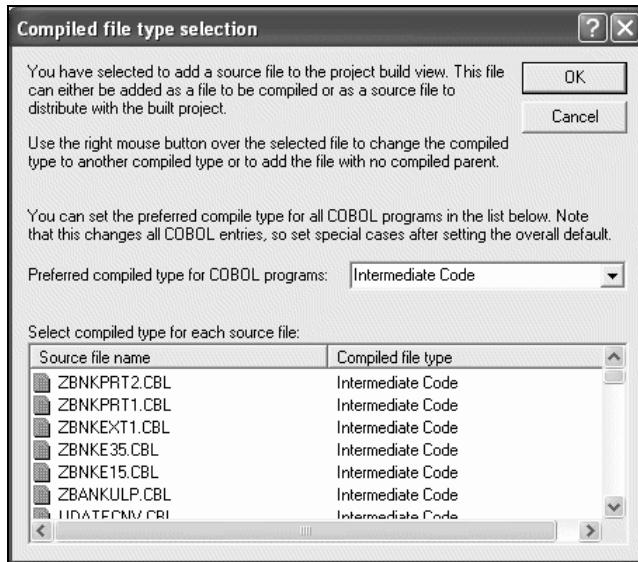
In the Add Files window, navigate to the folder that contains your files (e.g.:**\Bankdemo\CBL**). Select the desired file(s); press **Add**.



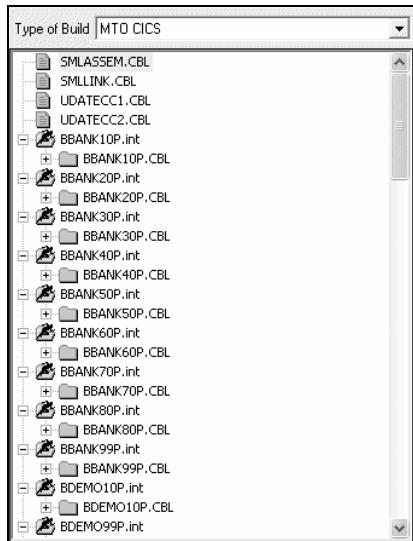
- Check **No to all** followed by **No**:



- Select all CBL from the Source Pool, drag and drop them to the Project Tree View. Click **OK** to accept the default compilation type (Intermediate code):



- The Project Tree View hierarchy is updated:



- Click on the Rebuild icon and check that there are no errors.

```
PCOMMON processing completed
Rebuilding      C:\Bankdemo\CB1\SBANK20P.CBL
Precompiler PCOMMON - Version $Revision: 1.13 $
PCOMMON processing completed
Rebuilding      C:\Bankdemo\CB1\SBANK10P.CBL
Precompiler PCOMMON - Version $Revision: 1.13 $
PCOMMON processing completed
Rebuild complete
```

Note: The PCOMMON messages.

- Check the contents of the Dirfolder. The folder will contain a directives file for each COBOL program.

Note: The programs are ready for execution; however the database and Enterprise Server need to be configured.

Module 2

Adding database capabilities to the project

Overview

The Migration product set offers extensive database support. In this module we shall use the Micro Focus-supplied SQL Option for DB2 to demonstrate the RDBMS capabilities.

Objectives

After completing this module, you will be able to:

- Configure the SQL Option for DB2 (XDB).
- Load the requisite database tables
- Set up ODBC access.

Creating the Database Environment

Micro Focus Server for Mainframe Migration provides comprehensive support for all leading relational databases on Windows, UNIX and Linux including Microsoft SQL Server, Oracle, IBM DB2 (UDB), Sybase, Informix and Ingres.

In this project the Micro Focus SQL Option for DB2 is used.

Note:

Micro Focus SQL Option for DB2 (XDB) is provided for **development only**.

Configuring the SQL option for DB2

Create a location

- Load the BankdemoES project.
- Start the XDB Server.
Select **Tools | SQL for DB2 | Start Server**
- Select **Tools | SQL for DB2 | SQL Wizard**
On the **Catalog Browser** select the Location tab:



- Press the **Create** button:

Enter the following details:

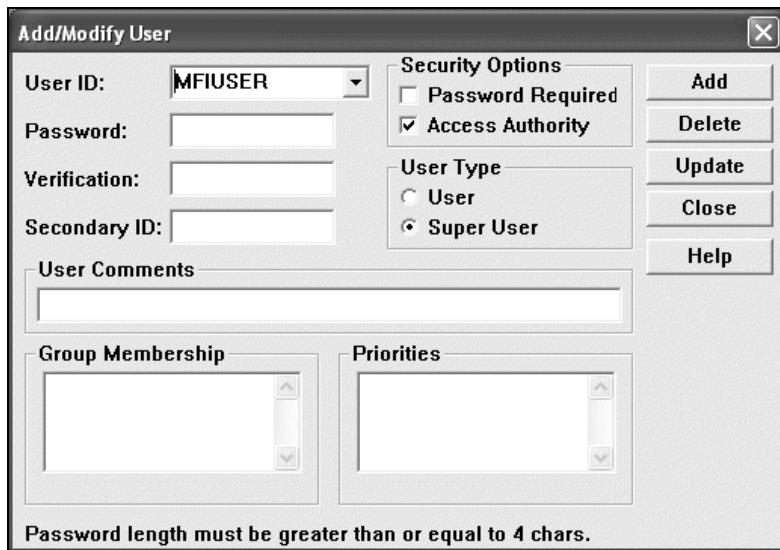


- Click **OK**.
- Press the **Refresh** button on the **Catalog Brower – location Tab**. Your newly created Bankdemo Location will now be listed:



- Create an Authid **MFIUSER**.

Select Admin | User and create a user as described below:



- Click **Add**.
- Close the SQL Wizard.

Note: User Type is **Super User**; Password NOT required.

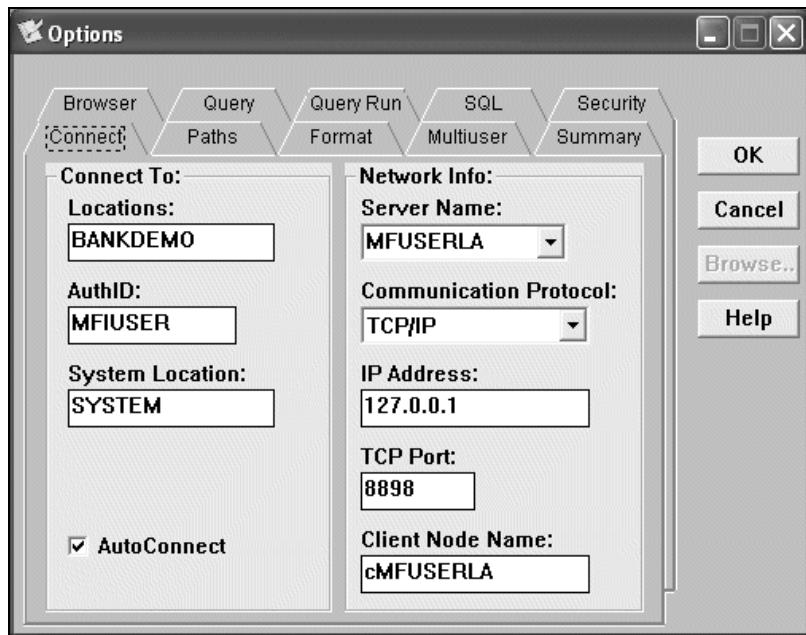
- Stop the Server.

Select Tools | SQL for DB2 | Stop Server

Configure default location

Specify the name of the default location you want to access when a connection is made.

- In the Net Express IDE select **Options | SQL for DB2 | Client:**



Select the **Connect** tab.

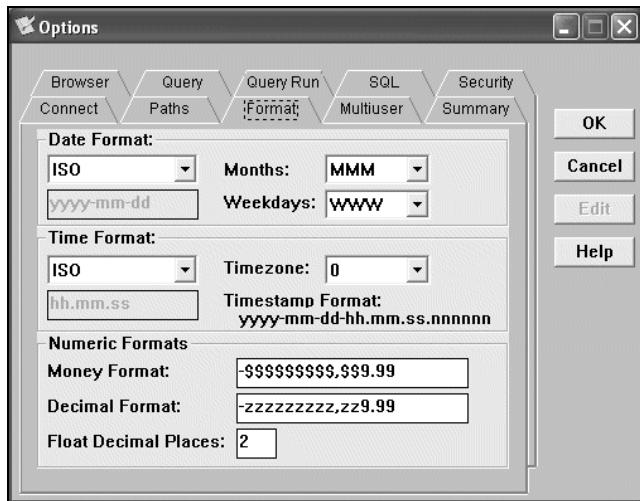
Set **Locations** to the new location **Bankdemo**

Set **Authid** to your userid **MFIUSER**

Set **Communication Protocol** to **TCP/IP**

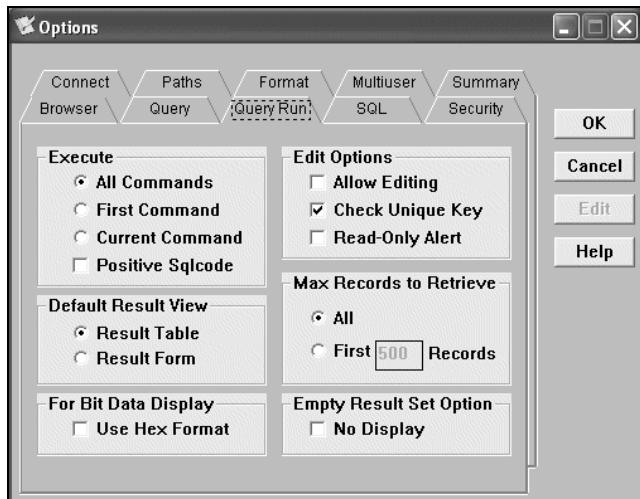
Enter the **server's IP address – 127.0.0.1** to access your local SQL Option server

- Select the **Format** tab:



Ensure the date and time format are set to **ISO**.

- Select the **Query Run** tab:

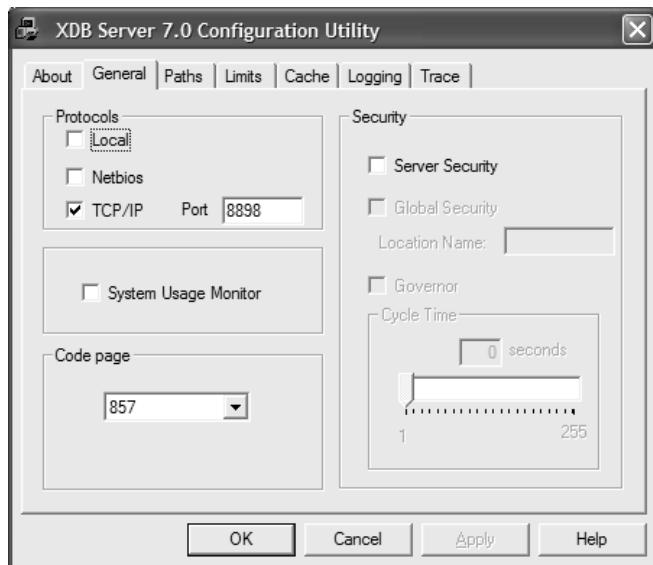


Ensure **All Commands** are selected.

Click **OK** to complete configuration.

- Make sure the XDB server uses the same protocol

In the Net Express IDE select **Options | SQL for DB2 | XDB Server:**



Loading tables

To load the tables required by the application ensure the Server is started.

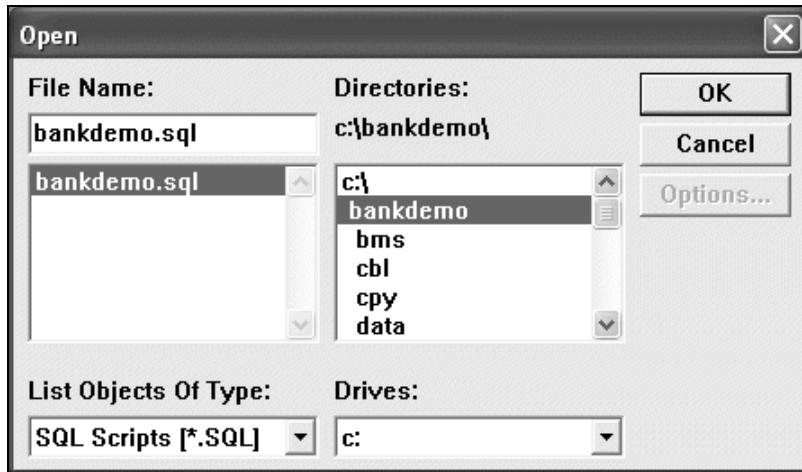
- Start the XDB Server.

Select **Tools | SQL for DB2 | Start Server**.

- Select **Tools | SQL for DB2 | SQL Wizard**:

Ensure the Location = BANKDEMO and the SQLID = MFIUSER

- Select **File | Open**:

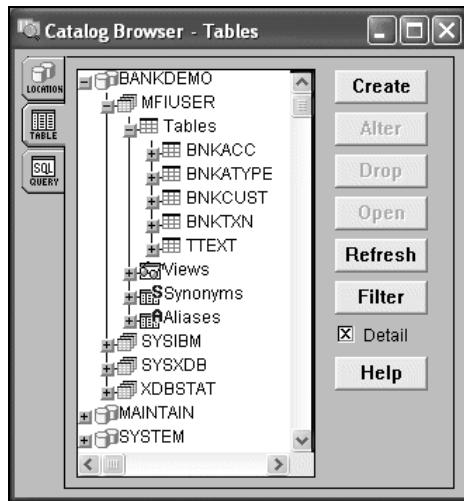


- Navigate to **C:\Bankdemo** and select the **Bankdemo.sql** script, followed by **OK**. The following screen appears:

```
SQL - C:\bankdemo\bankdemo.sql
CREATE TABLE MFUSER BNKCUST
(
  BCS_PID      CHAR(5) NOT NULL,
  BCS_NAME     CHAR(25) NOT NULL,
  BCS_NAME_FF  CHAR(25) NOT NULL,
  BCS_SIN      CHAR(9) NOT NULL WITH DEFAULT,
  BCS_ADDR1    CHAR(25) NOT NULL WITH DEFAULT,
  BCS_ADDR2    CHAR(25) NOT NULL WITH DEFAULT,
  BCS_STATE    CHAR(2) NOT NULL WITH DEFAULT,
  BCS_COUNTRY  CHAR(6) NOT NULL WITH DEFAULT,
  BCS_POST_CODE CHAR(12) NOT NULL WITH DEFAULT,
  BCS_TEL      CHAR(30) NOT NULL WITH DEFAULT,
  BCS_EMAIL    CHAR(1) NOT NULL WITH DEFAULT,
  BCS_SEND_MAIL CHAR(1) NOT NULL WITH DEFAULT,
  BCS_SEND_EMAIL CHAR(78) NOT NULL WITH DEFAULT,
  BCS_FILLER   PRIMARY KEY
  (
    BCS_PID
  )
)
```

- Select **Query | Run**.

When the script is complete, **select the Refresh button on the Catalog Browser**.



- Double-click on the BNKACC table to view its contents:

Row #	BAC_PID	BAC_ACNO	BAC_ACCTYPE	BAC_BALANCE	BAC_LAST_STMT_DTE	BAC_LAST_STMT_BAL
* 1	B0001	737590226	2	-54.80	2000-10-20	-514.80
2	B0001	541374829	3	3.60	2000-10-20	3.61
3	B0001	450061494	1	290.12	2000-10-20	750.12
4	B0002	962732474	1	67.69	2000-10-20	67.69
5	B0003	731813282	2	432.96	2000-10-20	432.96
6	B0003	280458951	5	372.24	2000-10-20	372.24
7	B0004	310781989	3	795.52	2000-10-20	795.53
8	B0004	014289253	2	-79.40	2000-10-20	-79.41
9	B0004	338886041	1	91.14	2000-10-20	91.14
10	B0004	067606426	4	192.24	2000-10-20	192.24
11	B0004	067606427	5	1,453.97	2000-10-20	1,453.974.00
12	B0005	394333383	1	45.24	2000-10-20	45.24
13	B0006	612943325	2	558.62	2000-10-20	558.62
14	B0006	417984029	1	122.64	2000-10-20	122.64
15	B0007	684793285	2	121.25	2000-10-20	121.25
16	B0007	704177665	1	532.40	2000-10-20	532.40
17	B0007	931085549	3	115.20	2000-10-20	115.20
18	B0007	988052896	4	185.00	2000-10-20	185.00
19	B0007	725886510	5	39.60	2000-10-20	39.60
20	B0008	504706512	5	415.35	2000-10-20	415.35
21	B0008	698300146	2	160.65	2000-10-20	160.65
22	B0008	917953926	1	174.41	2000-10-20	174.41
23	B0008	126195094	3	423.60	2000-10-20	423.60
24	B0009	613638770	3	51.87	2000-10-20	51.87
25	B0009	669078553	2	726.84	2000-10-20	726.84
26	B0009	492952259	5	69.86	2000-10-20	69.86

Configure XDB ODBC driver

In order to use OpenESQL to connect to your database, you must set up a Data Source Name (DSN).

The Net Express installation automatically installs the XDB driver if you select to install SQL Option.

- Create a **system** data source for Bankdemo.

Open the Windows **Control Panel**

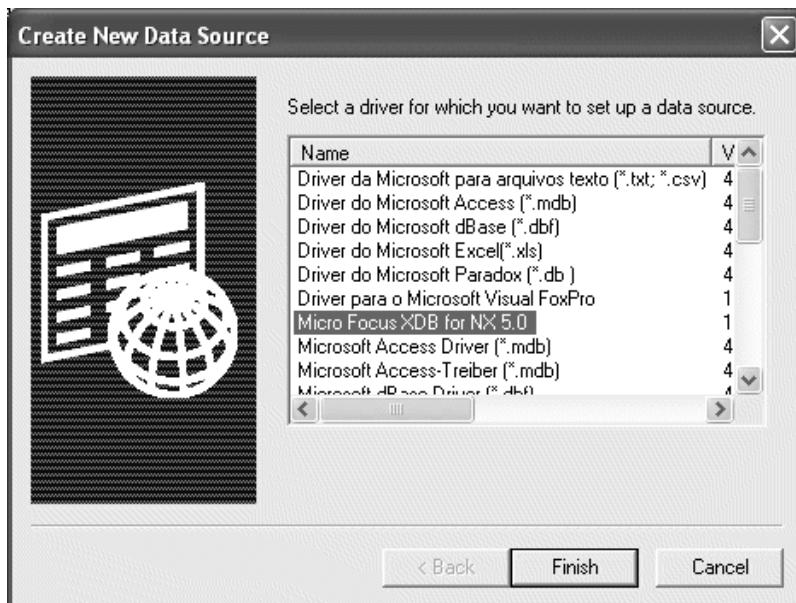
Select **Administration Tools**

Select **Data Source(ODBC)**

Select the **System DSN** tab

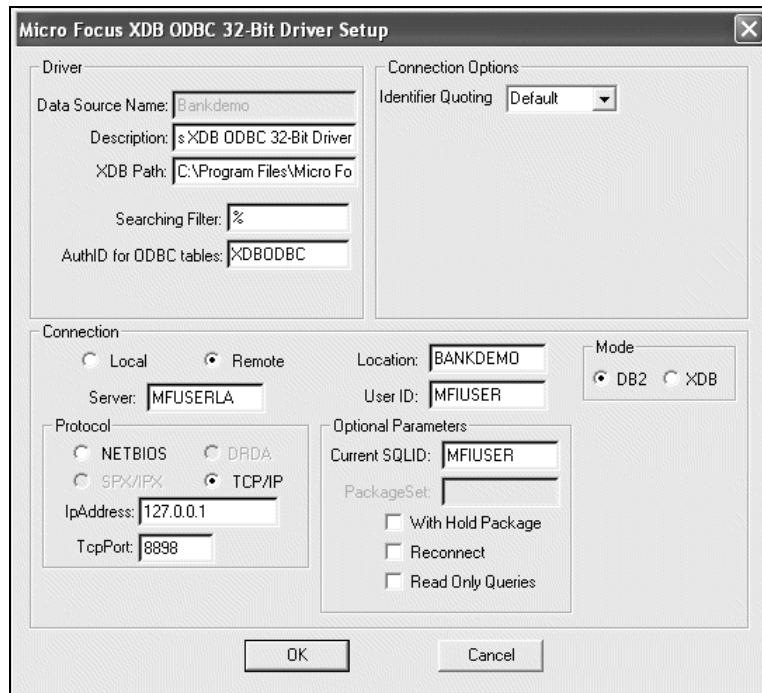
Click the **Add ...** Button

Select Micro Focus XDB for NX5.0

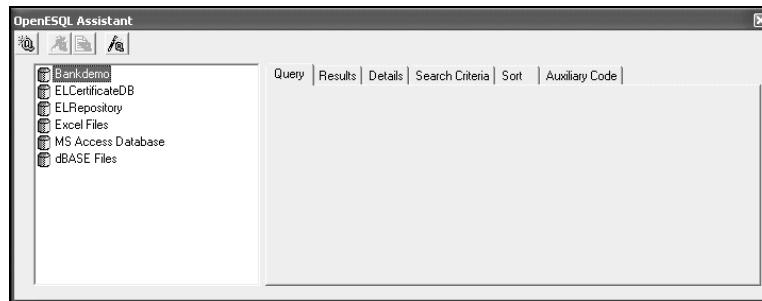


- Click **Finish**.

- The following screen appears, enter details as described below:



- Click **OK**.
- Test the connection using the OpenESQL Assistant.



Module 3

Setting up Enterprise Server

Overview

We shall now use Enterprise Server Administration to add a Server for the **BankDemo** application.

Objectives

After completing this module, you will be able to:

- Start ES Administration in one of two different ways.
- Add a server with Mainframe Transaction Option capability to the system.

Add Bankdemo Enterprise Server

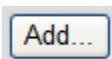
Start Enterprise Server Administration using one of the following methods:

- Select **Start, All Programs, Micro Focus Net Express 5.0, Configuration, Enterprise Server Administration.**
- Start a web browser and enter the URL <http://localhost:86>.

The Enterprise Server Administration home page is displayed:

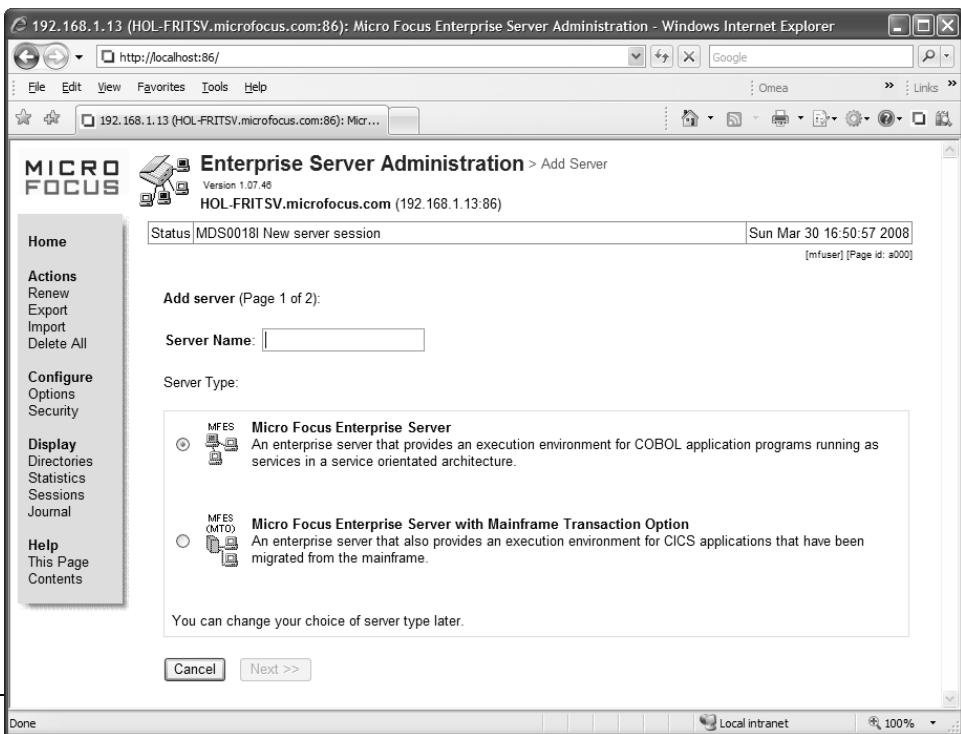
The screenshot shows the Micro Focus Enterprise Server Administration interface. The title bar reads "192.168.1.13 (HOL-FRITSV.microfocus.com:86): Micro Focus Enterprise Server Administration - Windows Internet Explorer". The main content area displays the "Enterprise Server Administration" page. On the left, a sidebar menu includes "Home", "Actions" (Renew, Export, Import, Delete All), "Configure" (Options, Security), "Display" (Directories, Statistics, Sessions, Journal), and "Help" (This Page, Contents). The central panel shows a table titled "1 - 1 of 1 Servers". The table has columns: Type, Name, Current Status, Communications Processes, Licenses, Status Log, Objects, and Description. One row is listed: "MFES" under Type, "ESDEMO" under Name, "Stopped" under Current Status, "1 top:192.168.1.13:9000 (HOL-FRITSV.microfocus.com)" under Communications Processes, and "3 Listeners [Details]" under Processes. The "Status Log" section shows "OK". To the right of the table, there are buttons for "Server: []", "CP: []", "5 Services [Details]", "2 Handlers [Details]", and "0 Packages [Add...]".

- In order to add the Bankdemo Enterprise Server select the add button:



The Add Server page appears:

- Enter **BANKDEMO** in the Server Name field.
- Select **Micro Focus Enterprise Server with Mainframe Transaction Option**:



The screenshot shows a Windows Internet Explorer window titled "Enterprise Server Administration > Add Server". The URL is "http://localhost:86". The page displays the following information:

- Status:** MDS0018I New server session
- Date:** Sun Mar 30 16:50:57 2008
- [infuser] [Page id: a000]**
- Add server (Page 1 of 2):**
- Server Name:** BankDemo
- Server Type:**
 - MFES** **Micro Focus Enterprise Server**
An enterprise server that provides an execution environment for COBOL application programs running as services in a service orientated architecture.
 - MFES (MTO)** **Micro Focus Enterprise Server with Mainframe Transaction Option**
An enterprise server that also provides an execution environment for CICS applications that have been migrated from the mainframe.
- Note:** You can change your choice of server type later.
- Buttons:** Cancel, Next >

- Select **Next >>**

The **Add Server** (Page 2 of 2) appears:

Add server (Page 2 of 2):

Server Name:

System Directory:

Startup Options:

Shared Memory Pages: <input type="text" value="256"/>	Service Execution Processes: <input type="text" value="2"/>
Shared Memory Cushion: <input type="text" value="32"/>	Trace Table Size: <input type="text" value="341"/>
Local Trace Size: <input type="text" value="341"/>	Maximum Diagnostics File Size: <input type="text" value="0"/>
Requested Licenses: <input type="text" value="10"/>	
Cold Start Diagnostics File: <input checked="" type="checkbox"/>	Dump on System Abend: <input checked="" type="checkbox"/>
Auxiliary Trace Active: <input type="checkbox"/>	Show Local Console: <input checked="" type="checkbox"/>
Mainframe Transaction Option: <input type="checkbox"/>	

Trace Flags:

Task Control <input type="checkbox"/>	Storage Control <input type="checkbox"/>	Table Management <input type="checkbox"/>
Application Container <input type="checkbox"/>	Request Handler <input type="checkbox"/>	RM Interface <input type="checkbox"/>
Communications <input type="checkbox"/>	Application <input type="checkbox"/>	Exit <input type="checkbox"/>

Creation Options:

Create TN3270 listener <input checked="" type="checkbox"/>	using port <input type="text"/>
Create ISC listener <input checked="" type="checkbox"/>	using port <input type="text"/>

Configuration Information:

Description:

Communications server for Web Services

Buttons: Cancel, << Back, Add

- Uncheck “Create ISC listener”
- Change the port address of the TN3270 listener to 5349
- Select **Add**.

The main Enterprise Server Administration page appears:

This screenshot shows the Micro Focus Enterprise Server Administration interface in a Windows Internet Explorer browser. The title bar reads "192.168.1.13 (HOL-FRITSV.microfocus.com:86): Micro Focus Enterprise Server Administration - Windows Internet Explorer". The main content area displays two server entries:

Type	Name	Current Status	Communications Processes	Licenses	Status Log	Objects	Description
MFES (MTO)	BANKDEMO	Stopped	1 top.* Start... 3 Listeners [Details]	- / 10	Server: CP 1: OK	4 Services [Details] 3 Handlers [Details] 0 Packages [Add...]	Communications server for Web Services
MFES	ESEDEMO	Stopped	1 top:192.168.1.13*8000 (HOL-FRITSV.microfocus.com) Start... 3 Listeners [Details]	- / 10	Server: CP 1: OK	5 Services [Details] 2 Handlers [Details] 0 Packages [Add...]	Communications server for Web Services

The left sidebar contains navigation links for Home, Actions (Renew, Export, Import, Delete All), Configure (Options, Security), Display (Directories, Statistics, Sessions, Journal), and Help (This Page, Contents). The status bar at the bottom indicates "Local intranet" and "100%".

- Click on the EDIT button left of BANKDEMO

This screenshot shows the "Listeners" configuration for the BANKDEMO server. The title bar reads "192.168.1.13 (HOL-FRITSV.microfocus.com:86): Micro Focus Enterprise Server Administration > BANKDEMO > Listeners". The main content area shows the following details:

Server BANKDEMO [Stopped]

Listener Display Filters: Process: 1, Conversation Type: All, Status: All

Communications Process 1 (Auto-start checked)

Listeners	Process ID	Control Channel Address	Status	Last Status Change	Status Log	Version
3	-	top.*	Stopped	03/30/08-17:04:40	Stopped OK	

Listeners:

Name	Address	Status	Last Status Change	Status Log	Conversation Type	Custom Configuration	Description
Web Services and J2EE	top.*	Stopped	03/30/08-17:04:40	OK	Web Services and J2EE	[virtual paths] cgi=<ES>/bin/uploads=<ES>/deploy-docs=<ES>/help [allow] ogmrimf/deploy.exe uploads*.txt <car>*.wsdl	Web Services and J2EE via HTTP/SOAP
Web	top.*	Stopped	03/30/08-17:04:40	OK	Web	[virtual paths] cgi=<ES>/bin/uploads=<ES>/deploy-docs=<ES>/help [allow] ogmrimf/deploy.exe uploads*.txt <car>*.wsdl	Basic HTTP web server
TN3270	top.*.5349	Stopped	03/30/08-17:04:40	OK	TN3270		Default TN3270 listener

The left sidebar and status bar are identical to the previous screenshot.

The screenshot shows a Windows Internet Explorer window titled "Enterprise Server Administration - Windows Internet Explorer". The URL is http://localhost:86/page=100_action_=Listeners_action_U*1.2.840.5043.01.025.e11958.12068894802000. The page displays the "Listeners" section for the "BANKDEMO" server. The left sidebar has links for Home, Actions (Renew, Export, Import, Delete All), Configure (Options, Security), Display (Directories, Statistics, Sessions, Journal), and Help (This Page, Contents). The main content area shows a table of listeners:

Process	Listener ID	Name	Address	Status	Last Status Change	Status Log	Conversation Type	Custom Configuration	Description
1	3	Web Services and J2EE	top.*.*	Stopped	03/30/08-17:04:40	OK	Web Services and J2EE	[virtual paths] cgi=<ES>/bin/uploads=<ES>/deploy-docs=<ES>/help [allow] cgi=info/deploy.exe uploads=<ES> *.car *.wsdl	Web Services and J2EE via HTTP/SOAP
	Add...	Web	top.*.*	Stopped	03/30/08-17:04:40	OK	Web	[virtual paths] cgi=<ES>/bin/uploads=<ES>/deploy-docs=<ES>/help [allow] cgi=info/deploy.exe uploads=<ES> *.car *.wsdl	Basic HTTP web server
	Edit...	TN3270	top.*.5349	Stopped	03/30/08-17:04:40	OK	TN3270		Default TN3270 listener

The "Edit..." button for the first row (Process 1, Listener 3) is highlighted with a black box.

- Click on the Leftmost EDIT button

Micro Focus Studio™ for Mainframe Migration

The screenshot shows a Windows Internet Explorer window titled "192.168.1.13 (HOL-FRITSV.microfocus.com:86): Micro Focus Enterprise Server Administration - Windows Internet Explorer". The URL in the address bar is "http://localhost:86?page=100_action_=listeners_action_U*1.2.840.5043.01.025.e11958.1206889". The page content is the "Enterprise Server Administration" interface for a server named "BANKDEMO". The main area shows a "Communications Process 1 Edit" dialog. The "Control Channel Address" field contains "tcp : **". The "Configuration Information" section shows the value "[soap] region=BANKDEMO". Navigation tabs at the top include Home, Actions, Configure, Display, Help, and a toolbar with icons for Home, Favorites, Tools, and Help.

- Change the protocol address to **9300**

Micro Focus Studio™ for Mainframe Migration

192.168.1.13 (HOL-FRITSV.microfocus.com:86): Micro Focus Enterprise Server Administration - Windows Internet Explorer

File Edit View Favorites Tools Help

192.168.1.13 (HOL-FRITSV.microfocus.com:86): Micr...

Enterprise Server Administration > BANKDEMO > Communications Process 1 Edit

Version 1.07.48
HOL-FRITSV.microfocus.com (192.168.1.13:86)

Status MDS0000I OK Sun Mar 30 17:27:42 2008 [mfuser] [Page id: c400]

Home Actions Renew Export Import Delete All Configure Options Security Display Directories Statistics Sessions Journal Help This Page Contents

Server... Listeners (3) Services (4) Handlers (3) Packages (0)

Communications Process 1

Control Channel Address :

Configuration Information

```
[soap]
region=BANKDEMO
```

Cancel OK

Done Local intranet 100%

The screenshot shows a web-based administration interface for Micro Focus Enterprise Server. On the left is a sidebar with navigation links like Home, Actions, Configure, and Help. The main area displays a configuration dialog for a 'Communications Process 1'. It includes tabs for Server, Listeners, Services, Handlers, and Packages. The 'Listeners' tab is selected, showing a control channel address of 'tcp' on port '9300'. Below this is a 'Configuration Information' section containing the configuration entry: '[soap]\nregion=BANKDEMO'. At the bottom of the dialog are 'Cancel' and 'OK' buttons. The status bar at the bottom indicates the page is 'MDS0000I OK' and the date and time are 'Sun Mar 30 17:27:42 2008'. The title bar shows the full URL 'http://localhost:86/page=100_action_=Listeners_action_U*1.2.840.5043.01.025.e11958.1206889'.

- Select **OK**
- Select **Home**

The Bankdemo enterprise server has been created and appears in the list.

Enterprise Server Administration

Status: MDS00001 OK | Date: Sun Mar 30 17:35:56 2008 | Page id: 1000

Actions: Renew, Export, Import, Delete All

Configure: Options, Security

Display: Directories, Statistics, Sessions, Journal

Help: This Page, Contents

Type	Name	Current Status	Communications Processes	Licenses	Status Log	Objects	Description
MFES (MTO)	BANKDEMO	Stopped	[Start...]				
MFES	ESDEMO	Stopped	[Start...]				

Add...

You have requested that the following server is started:

Type	Name	Status Log	Description
MFES (MTO)	BANKDEMO	Server: [] CP: []	Communications server for Web Services

Are you sure you want to continue?

OK Cancel

Security settings:

Using default ES Security Manager configuration.
No Security Managers in list.

Start processes as:

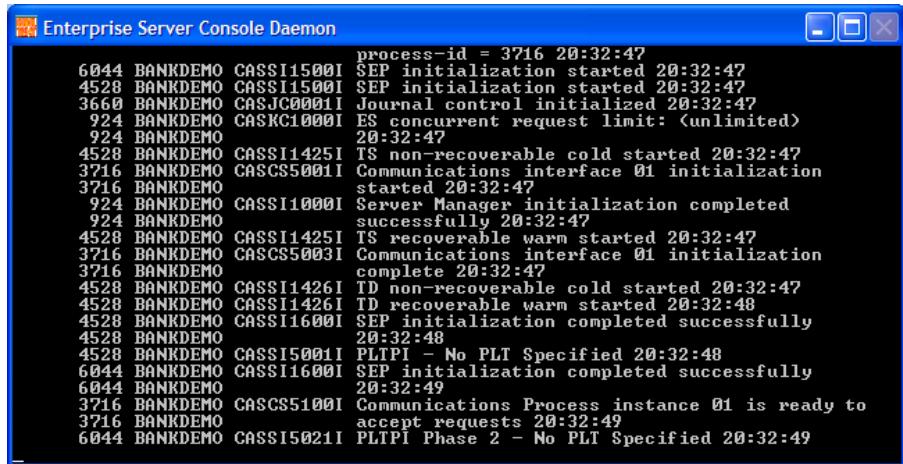
currently logged-on system user: "SYSTEM"
 different user
User ID: []
Password: []

Use Enterprise Server credentials of:

default #System group user
 currently logged-on administration user: "mfuser"
 different user
User ID: []
Password: []

Warning: 192.168.1.13:86 is not using an encrypted connection. Input credentials information may be exposed.

The Enterprise Server Console Daemon (Console Log) appears:



```

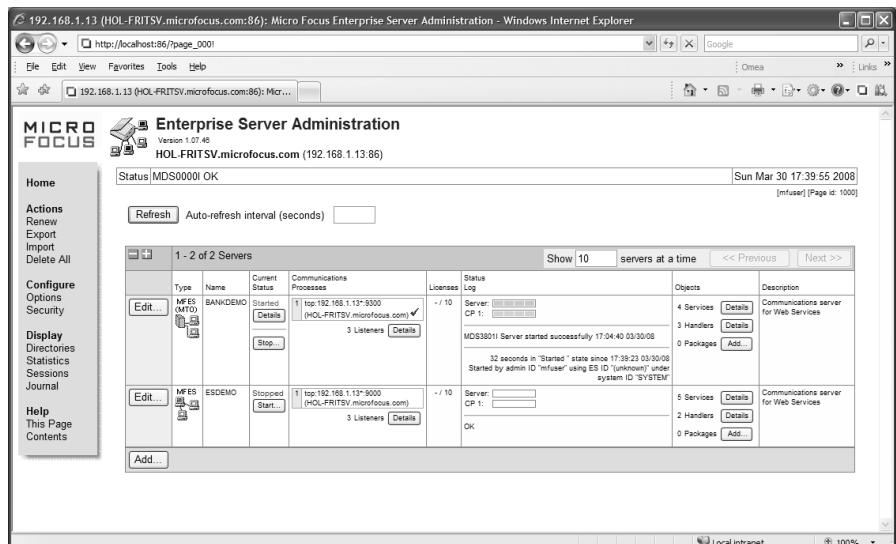
[Output from Enterprise Server Console Daemon window]
process-id = 3716 20:32:47
6044 BANKDEMO CASSI15001 SEP initialization started 20:32:47
4528 BANKDEMO CASSI15001 SEP initialization started 20:32:47
3660 BANKDEMO CASJC0001I Journal control initialized 20:32:47
924 BANKDEMO CASKC10001 ES concurrent request limit: <unlimited>
924 BANKDEMO 20:32:47
4528 BANKDEMO CASSI14251 TS non-recoverable cold started 20:32:47
3716 BANKDEMO CASCS5001I Communications interface 01 initialization
3716 BANKDEMO started 20:32:47
924 BANKDEMO CASSI10001 Server Manager initialization completed
924 BANKDEMO successfully 20:32:47
4528 BANKDEMO CASSI14251 TS recoverable warm started 20:32:47
3716 BANKDEMO CASCS5003I Communications interface 01 initialization
3716 BANKDEMO complete 20:32:47
4528 BANKDEMO CASSI14261 TD non-recoverable cold started 20:32:47
4528 BANKDEMO CASSI14261 TD recoverable warm started 20:32:48
4528 BANKDEMO CASSI16001 SEP initialization completed successfully
4528 BANKDEMO 20:32:48
4528 BANKDEMO CASSI15001 PLTP1 - No PLT Specified 20:32:48
6044 BANKDEMO CASSI16001 SEP initialization completed successfully
6044 BANKDEMO 20:32:49
3716 BANKDEMO CASCS51001 Communications Process instance 01 is ready to
3716 BANKDEMO accept requests 20:32:49
6044 BANKDEMO CASSI150211 PLTP1 Phase 2 - No PLT Specified 20:32:49

```

Wait a moment until the console.log stops scrolling

Focus on the Enterprise Server Administration home page:

- Select Refresh.



Enterprise Server Administration

Version 1.07.48
HOL-FRITSV.microfocus.com (192.168.1.13:86)

1 - 2 of 2 Servers							Show 10	servers at a time	<< Previous	Next >>	
Type	Name	Current Status	Communications Processes	Licenses	Status Log	Objects	Description				
MFS (MTO)	BANKDEMO	Started	1 top:192.168.1.13*5000 (HOL-FRITSV.microfocus.com) ✓ 3 Listeners [Details]	- / 10	Server: [] CP 1: []	4 Services [Details] 3 Handlers [Details] 0 Packages [Add...]	Communications server for Web Services				
MFS	ESDEMO	Stopped	1 top:192.168.1.13*5000 (HOL-FRITSV.microfocus.com) 3 Listeners [Details]	- / 10	Server: [] CP 1: []	5 Services [Details] 2 Handlers [Details] 0 Packages [Add...]	Communications server for Web Services				

BANKDEMO is Started

Module 4

CICS configuration

Overview

Although a BANKDEMO Server has been created, it must be set up to allow for CICS to run. This module details the configuration necessary for this.

Objectives

After completing this module, you will be able to:

- Configure the Server just created to give it CICS capability
- Be aware of the environment values needed for successful operation
- Know how to test whether a CICS system will run successfully in the Server.

Configure BankDemo Enterprise Server (CICS)

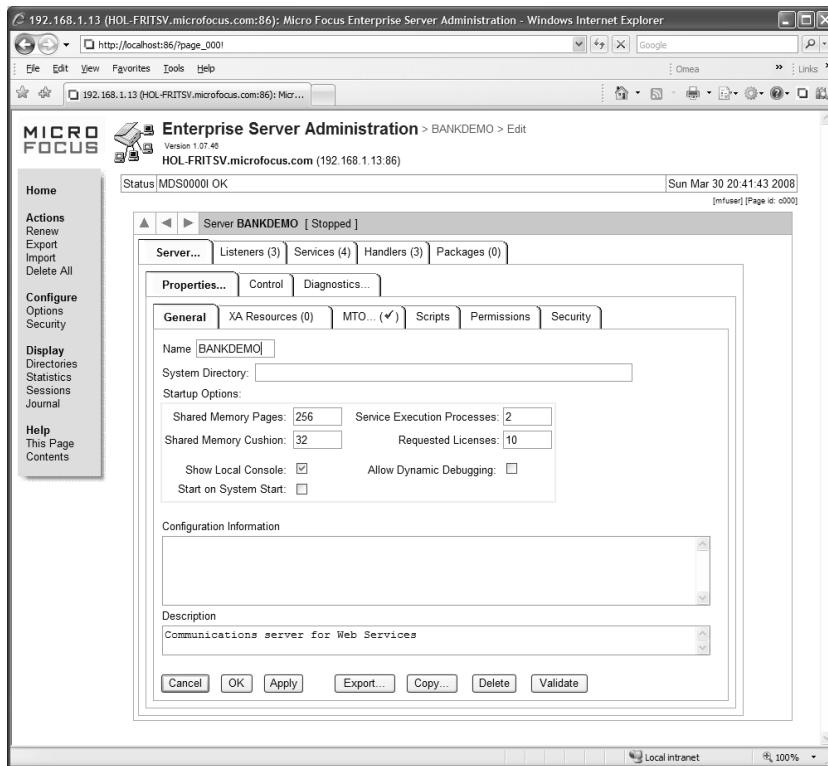
Start Enterprise Server Administration using one of the following methods:

- Select **Start, All Programs, Micro Focus Net Express 5.0, Configuration, Enterprise Server Administration.**
- Start a web browser and enter the URL [**http://localhost:86**](http://localhost:86).

The Enterprise Server Administration home page is displayed:

1 - 2 of 2 Servers						
Type	Name	Current Status	Communications Processes	Licenses	Status	Objects
MFS (MTO)	BANKDEMO	Stopped Start...	1 top 192.168.1.13*9000 (HOL-FRTSV.microfocus.com) 3 Listeners [Details]	- / 10	Server: [] CP 1: [] CASST00011 Server manager termination completed successfully 20:38:34 2 seconds in "Stopped" state since 20:38:35 03/30/08 Stopped by admin ID "mfuser" using ES ID "(unknown)" under system ID "SYSTEM"	4 Services [Details] 3 Handlers [Details] 0 Packages [Add...]
MFS (MTO)	ESDEMO	Stopped Start...	1 top 192.168.1.13*9000 (HOL-FRTSV.microfocus.com) 3 Listeners [Details]	- / 10	Server: [] CP 1: [] OK	5 Services [Details] 2 Handlers [Details] 0 Packages [Add...]

- Select **Edit** to the left of the Bankdemo enterprise server. The following screen appears:



In order to simplify additional configuration options, some global environment variables can be set.

Configuration Information

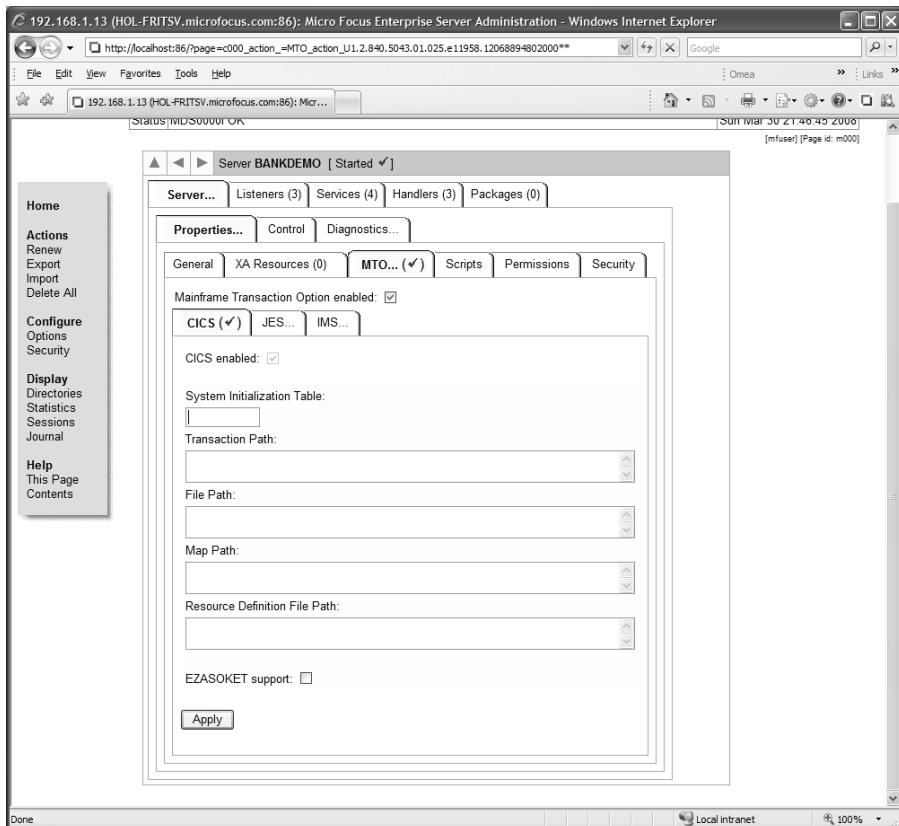
```
[ES-Environment]
ESPROJECT=c:\BankDemo
```

- In the Configuration Information enter the following:

The format for environment variables is

```
[ES-Environment]
environment-variable-name=environment-variable-setting
```

- Select the MTO tab, followed by the CICS tab:



The following must be configured in order to run the migrated Bankdemo application:

System Initialization Table

Specify the system initialization table (SIT) to be used by this enterprise server.

BANKSIT

Transaction Path

Specify the full path of the CICS transaction programs that will run in this enterprise server.

\$ESPROJECT\Loadlib

File Path

Specify the full path of the VSAM files required by the CICS transaction programs.

\$ESPROJECT\Data

Map Path

Specify the full path of any BMS map load modules required by the CICS transaction programs.

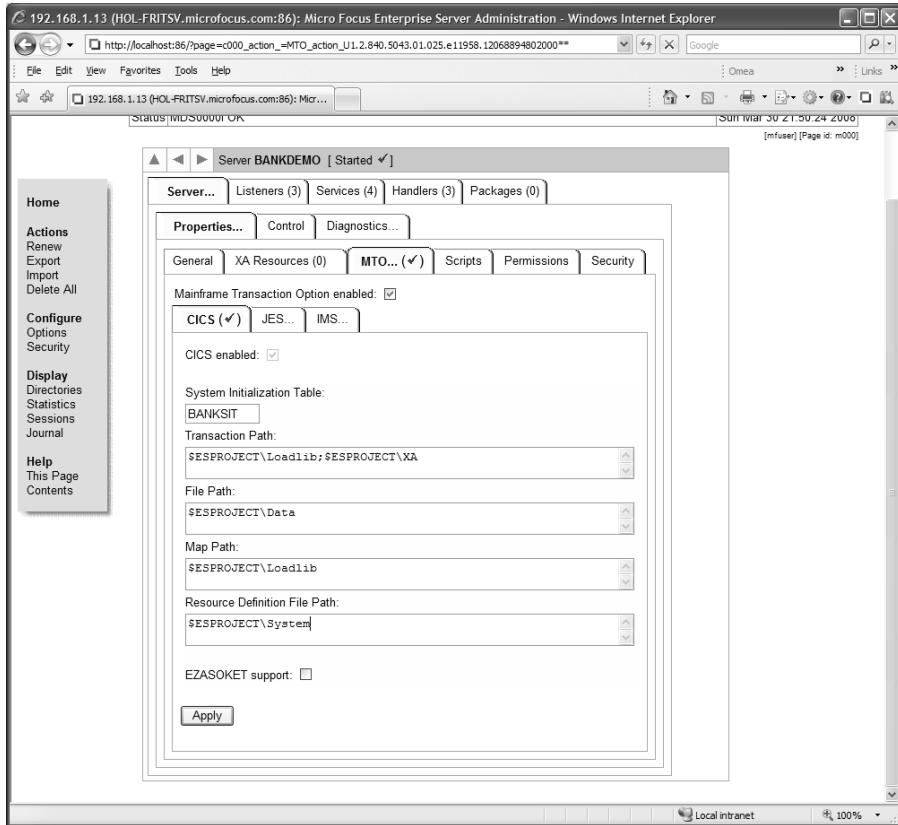
\$ESPROJECT\Loadlib

Resource Definition File Path

Specify the full path of the resource definition file for this enterprise server.

\$ESPROJECT\System

Note: Multiple paths must be separated with semi-colons on Windows or colons on UNIX. All fields are Mandatory if you use any SIT other than DFH\$IVP.



- Click **Apply**.
- Click **Home**

The main Enterprise Server Administration page appears:

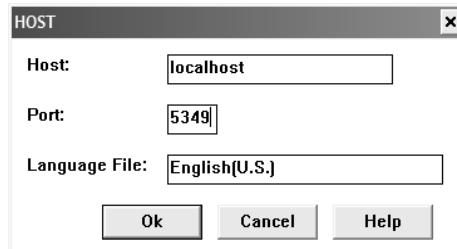
- Select **Start**.

In order to verify the Bankdemo enterprise server (MTO) is installed and working:

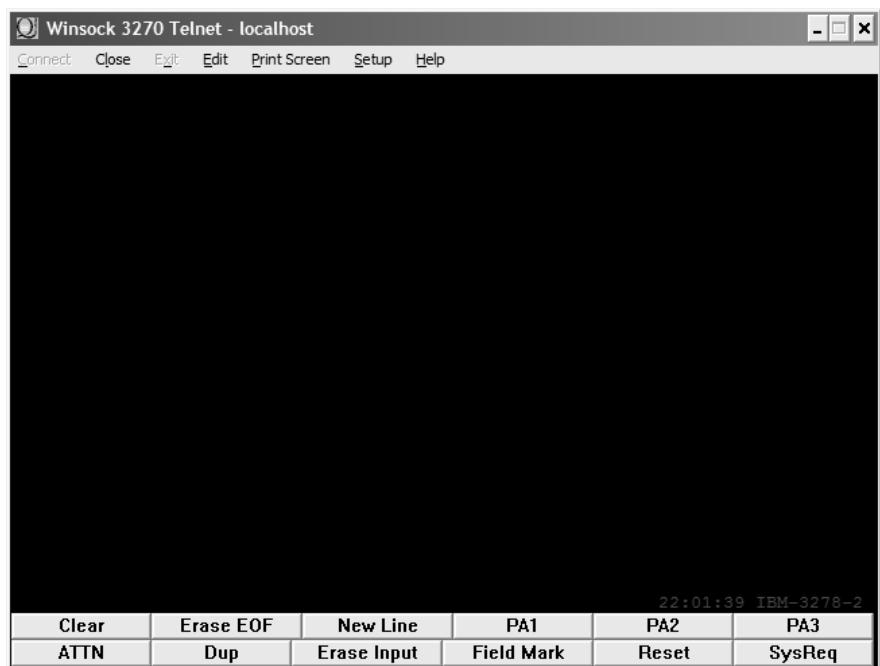
- Start a QWS3270 emulator.
- From the QWS3270 menu select **Connect**.

The following dialog appears:

- Type the port we assigned earlier (5349)
- Click **OK**.



The following screen appears.



Type the transaction code **CMAP** followed by enter.

The following screen appears:

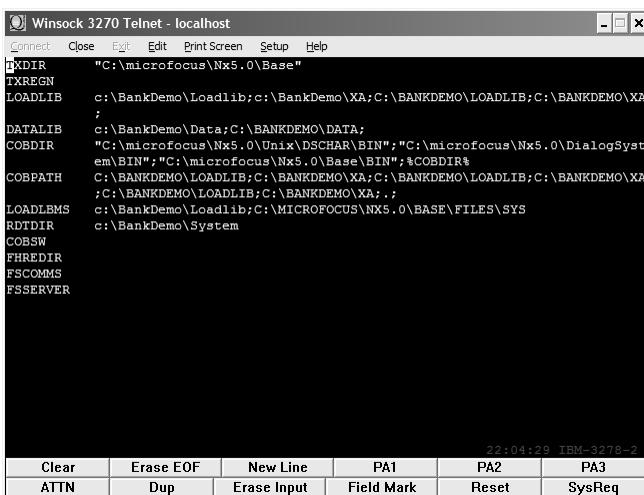
A screenshot of a Winsock 3270 Telnet window titled "Winsock 3270 Telnet - localhost". The window displays a list of mapsets. At the top, there are menu options: Connect, Close, Edit, Print Screen, Setup, Help. Below the menu, it says "CMAP - MAP DISPLAY PROGRAM (MAPSET LIST)" and "MAPSET Directory". To the right, it shows "Total # mapsets: 36". The main area lists mapsets with their corresponding paths:

MBANK10	c:\BankDemo\Loadlib\
MBANK20	c:\BankDemo\Loadlib\
MBANK30	c:\BankDemo\Loadlib\
MBANK40	c:\BankDemo\Loadlib\
MBANK50	c:\BankDemo\Loadlib\
MBANK60	c:\BankDemo\Loadlib\
MBANK70	c:\BankDemo\Loadlib\
MBANK80	c:\BankDemo\Loadlib\
MBANK99	c:\BankDemo\Loadlib\
MDEMO10	c:\BankDemo\Loadlib\
MDEMO99	c:\BankDemo\Loadlib\
ACCTSET	C:\MICROFOCUS\NX5.0\BASE\FILES\SYS\
CASIMAP	C:\MICROFOCUS\NX5.0\BASE\FILES\SYS\
CEBRHLP	C:\MICROFOCUS\NX5.0\BASE\FILES\SYS\
CEBRMSD	C:\MICROFOCUS\NX5.0\BASE\FILES\SYS\
CTRMSD	C:\MICROFOCUS\NX5.0\BASE\FILES\SYS\
DFHCDBG	C:\MICROFOCUS\NX5.0\BASE\FILES\SYS\
DFHCGWY	C:\MICROFOCUS\NX5.0\BASE\FILES\SYS\
...	

At the bottom, there is a status bar with the time "22:02:27" and "IBM-3278-2", and a function key row with buttons: Clear, Erase EOF, New Line, PA1, PA2, PA3, ATTN, Dup, Erase Input, Field Mark, Reset, SysReq.

Note: The Bankdemo maps now appear.

- Click **Clear**.
- Type the transaction **CENV** followed by enter, the following screen appears:



```

Winsock 3270 Telnet - localhost
Connect Close Edit Print Screen Setup Help
#DIR "C:\microfocus\Nx5.0\Base"
TXREGN
LOADLIB c:\BankDemo\Loadlib;c:\BankDemo\XA;C:\BANKDEMO\LOADLIB;C:\BANKDEMO\XA
;
DATALIB c:\BankDemo\Data;C:\BANKDEMO\DATA
COBDIR "C:\microfocus\Nx5.0\Unix\DSCHAR\BIN";"C:\microfocus\Nx5.0\DialogSyst
em\BIN";"C:\microfocus\Nx5.0\Base\BIN";%COBDIR%
COBPATH ;C:\BANKDEMO\LOADLIB;C:\BANKDEMO\XA;C:\BANKDEMO\LOADLIB;C:\BANKDEMO\XA
;C:\BANKDEMO\LOADLIB;C:\BANKDEMO\XA;;
LOADLMS c:\BankDemo\Loadlib;C:\MICROFOCUS\NX5.0\BASE\FILES\SYS
RDTDIR
COBSW
FIREDIR
FSCOMMS
FSSERVER

```

23:04:29 IBM-3278-2

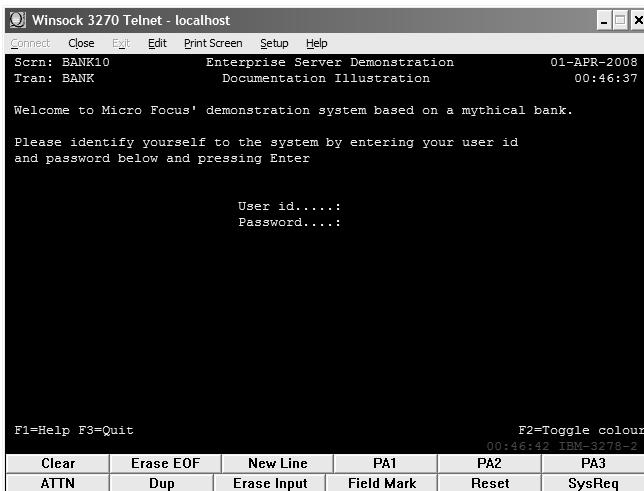
Clear	Erase EOF	New Line	PA1	PA2	PA3
ATTN	Dup	Erase Input	Field Mark	Reset	SysReq

Note: The Bankdemo environment appears.

The Bankdemo application can now be run / tested.

- Type the transaction **BANK** followed by enter.

The following screen appears:



```

Winsock 3270 Telnet - localhost
Connect Close Edit Print Screen Setup Help
Scrn: BANK10 Enterprise Server Demonstration 01-APR-2008
Tran: BANK Documentation Illustration 00:46:37
Welcome to Micro Focus' demonstration system based on a mythical bank.
Please identify yourself to the system by entering your user id
and password below and pressing Enter

User id....:
Password....:

F1=Help F3=Quit F2=Toggle colour
00:46:42 IBM-3278-2

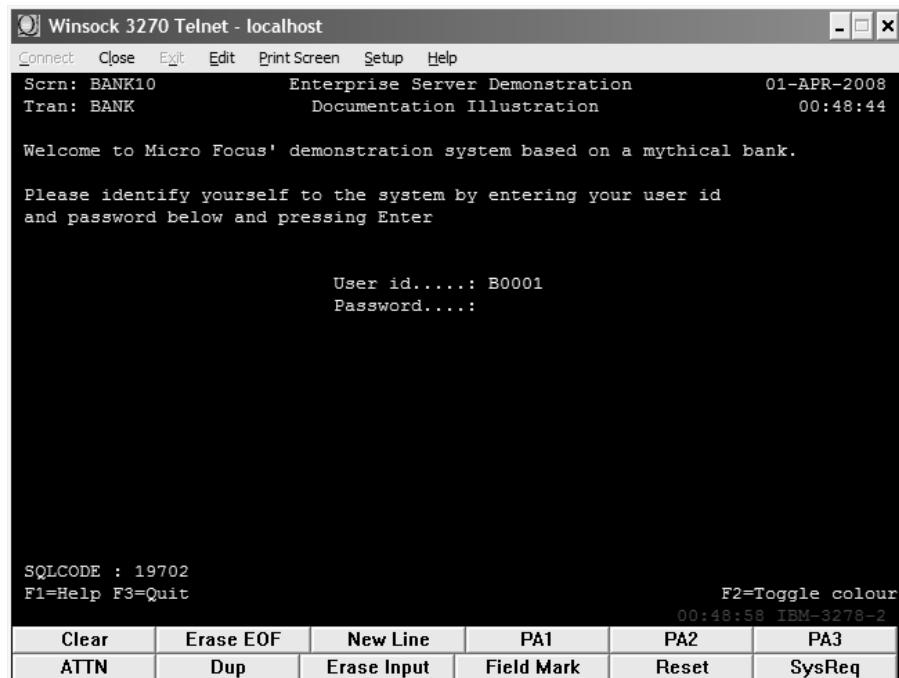
```

Clear	Erase EOF	New Line	PA1	PA2	PA3
ATTN	Dup	Erase Input	Field Mark	Reset	SysReq

- Enter the user id and password then enter:

USERID: **B0001** PASSWORD: **X**

The following screen appears:



Note: SQLCODE 19702 – Connection name not found. The database connection has not been configured.

This page is intentionally blank.

Module 5

XA setup

Overview

In the last module we saw that although a CICS application was able to run successfully, the database connectivity was absent. This connectivity is defined using the XA option.

Objectives

After completing this module, you will be able to:

- Define the XA switch module
- Know how to test that database access has been set up.

Configure BankDemo ES XA Resources

Start Enterprise Server Administration using one of the following methods:

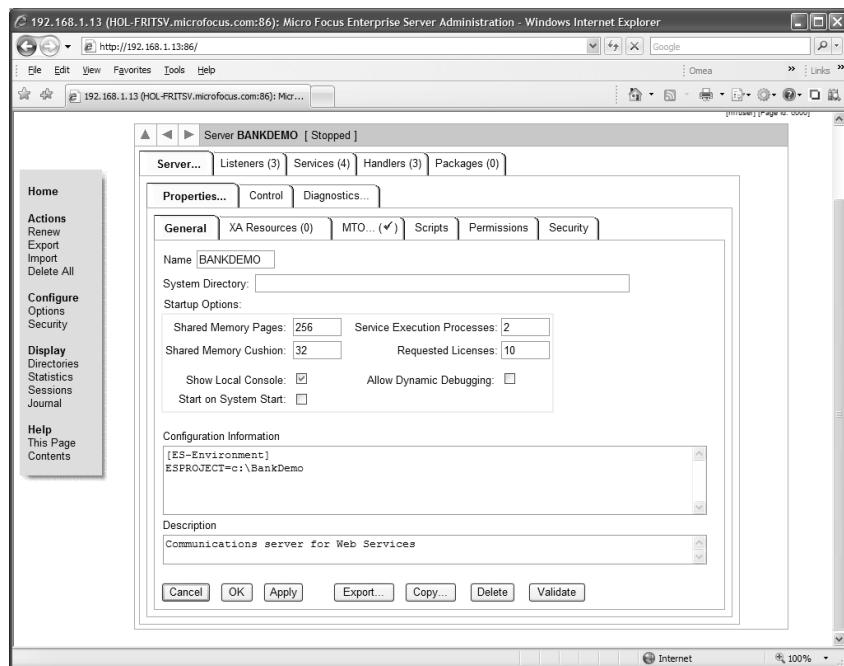
- Select **Start, All Programs, Micro Focus Net Express 5.0, Configuration, Enterprise Server Administration.**
- Start a web browser and enter the URL [**http://localhost:86**](http://localhost:86).

The Enterprise Server Administration home page is displayed:

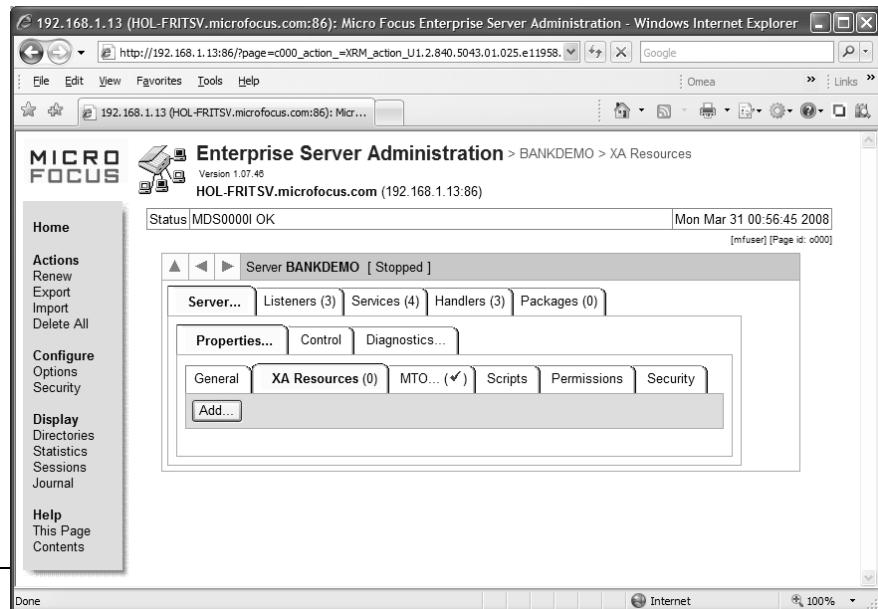
Type	Name	Current Status	Communications Processes	Licenses	Status Log	Objects	Description
MFES (MTO)	BANKDEMO	Stopped	1 top:192.168.1.13*9000 (HOL-FRITSV.microfocus.com)	- / 10	Server: [] CP 1: [] CASST0011 Server manager termination completed successfully 00:53:07 11 seconds in "Stopped" state since 00:53:13 03/31/08 Stopped by admin ID "mfuser" using ES ID "[unknown]" under system ID "SYSTEM"	4 Services 3 Handlers 0 Packages	Communications server for Web Services
MFES	ESDEMO	Stopped	1 top:192.168.1.13*9000 (HOL-FRITSV.microfocus.com)	- / 10	Server: [] CP 1: [] OK	5 Services 2 Handlers 0 Packages	Communications server for Web Services

If it is still started, we want to stop it.

- Select **Edit** to the left of the Bankdemo enterprise server. The following screen appears:

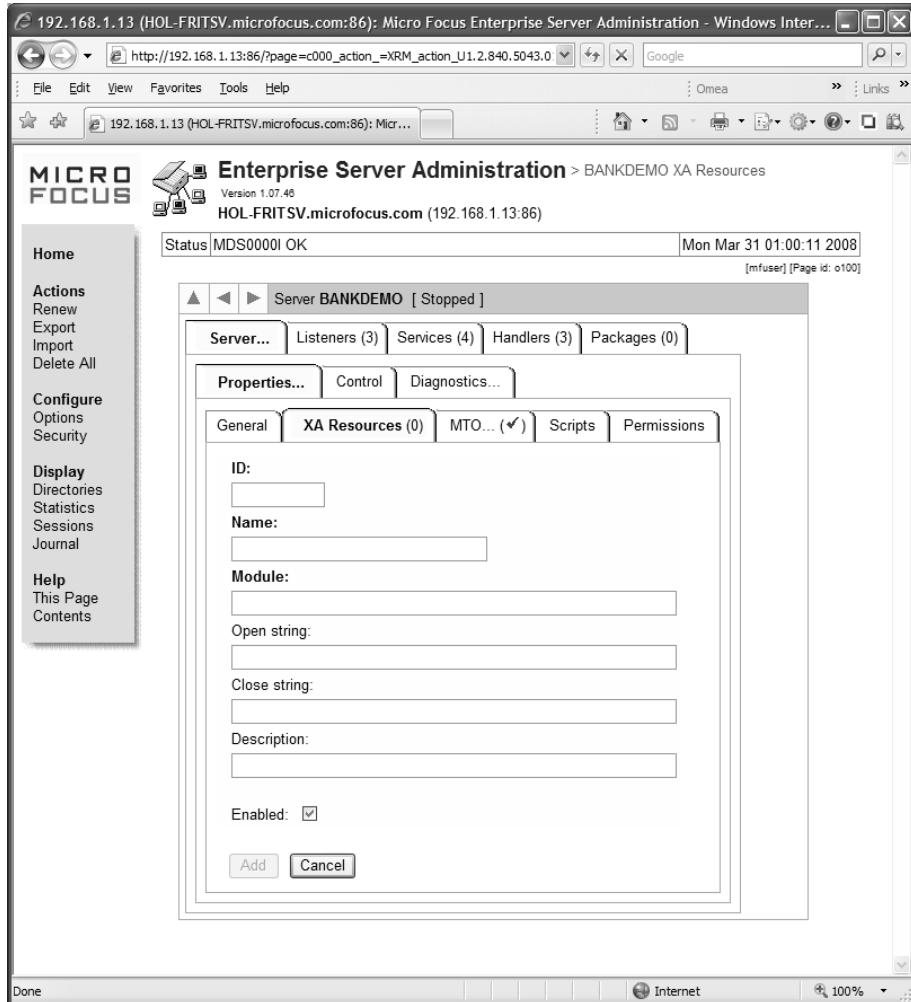


- Select the **XA Resources** tab.



- Select **Add**.

The following screen appears:



The MS SQL Server XA switch module must be defined within Enterprise Server.

- Add the following settings for the XA Resource:

Parameters	Value
ID:	DB7R
Name:	ODBC/XDB
Module:	C:\Bankdemo\XA\ESODBCXA.DLL
Open String:	DSN=Bankdemo

The screenshot shows a web-based administration interface for Micro Focus Enterprise Server. The title bar indicates the URL is <http://192.168.1.13:86/>. The main content area is titled "Enterprise Server Administration > BANKDEMO XA Resources". The left sidebar contains navigation links for Home, Actions (Renew, Export, Import, Delete All), Configure (Options, Security), Display (Directories, Statistics, Sessions, Journal), and Help (This Page, Contents). The right panel displays the configuration details for a "Server BANKDEMO [Stopped]". The "XA Resources (0)" tab is selected. The configuration fields include:

- ID: ORA
- Name: ODBC/XDB
- Module: C:\Bankdemo\XA\ESODBCXA.DLL
- Open string: DSN=Bankdemo
- Close string: (empty)
- Description: (empty)
- Enabled:

At the bottom of the configuration panel are "Add" and "Cancel" buttons. The status bar at the bottom of the browser window shows "Done" and "Internet 100%".

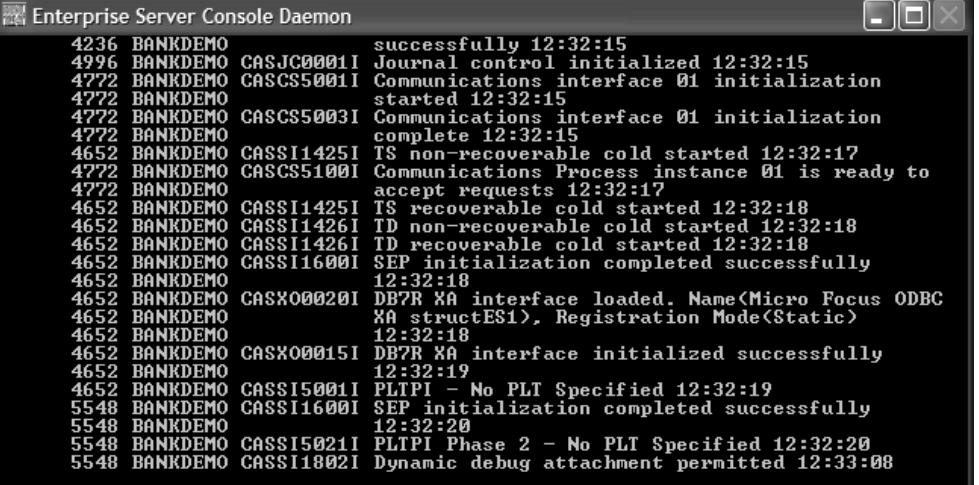
- Click **Add**.

In order for these settings to be used, the Bankdemo enterprise server must be (re)started.

Return to the main Enterprise Server Administration page:

- Select **Start**:

The Enterprise Server Console Daemon (Console Log) appears:



The screenshot shows a Windows-style console window titled "Enterprise Server Console Daemon". The window contains a list of log messages from the "BANKDEMO" enterprise server. The messages detail the startup of various components, including journal control, communications interfaces, and database engines (DB2R XA interface). The log entries are timestamped, showing the process starting at 12:32:15 and continuing through to 12:33:08.

```
4236 BANKDEMO successfully 12:32:15
4996 BANKDEMO CASJC0001I Journal control initialized 12:32:15
4772 BANKDEMO CASCS5001I Communications interface 01 initialization
4772 BANKDEMO started 12:32:15
4772 BANKDEMO CASCS5003I Communications interface 01 initialization
4772 BANKDEMO complete 12:32:15
4652 BANKDEMO CASSI1425I TS non-recoverable cold started 12:32:17
4772 BANKDEMO CASCS5100I Communications Process instance 01 is ready to
4772 BANKDEMO accept requests 12:32:17
4652 BANKDEMO CASSI1425I TS recoverable cold started 12:32:18
4652 BANKDEMO CASSI1426I TD non-recoverable cold started 12:32:18
4652 BANKDEMO CASSI1426I TD recoverable cold started 12:32:18
4652 BANKDEMO CASSI1600I SEP initialization completed successfully
4652 BANKDEMO 12:32:18
4652 BANKDEMO CASX00020I DB2R XA interface loaded. Name<Micro Focus ODBC
4652 BANKDEMO XA structES1>, Registration Mode<Static>
4652 BANKDEMO 12:32:18
4652 BANKDEMO CASX00015I DB2R XA interface initialized successfully
4652 BANKDEMO 12:32:19
4652 BANKDEMO CASSI15001I PLTPI - No PLT Specified 12:32:19
5548 BANKDEMO CASSI1600I SEP initialization completed successfully
5548 BANKDEMO 12:32:20
5548 BANKDEMO CASSI15021I PLTPI Phase 2 - No PLT Specified 12:32:20
5548 BANKDEMO CASSI1802I Dynamic debug attachment permitted 12:33:08
```

Note: The ODBC XA interface is loaded.

- Focus on the Enterprise Server Administration home page:

The screenshot shows the Micro Focus Enterprise Server Administration interface in a Windows Internet Explorer browser window. The URL is <http://192.168.1.13:86/>. The main content area displays a table of servers:

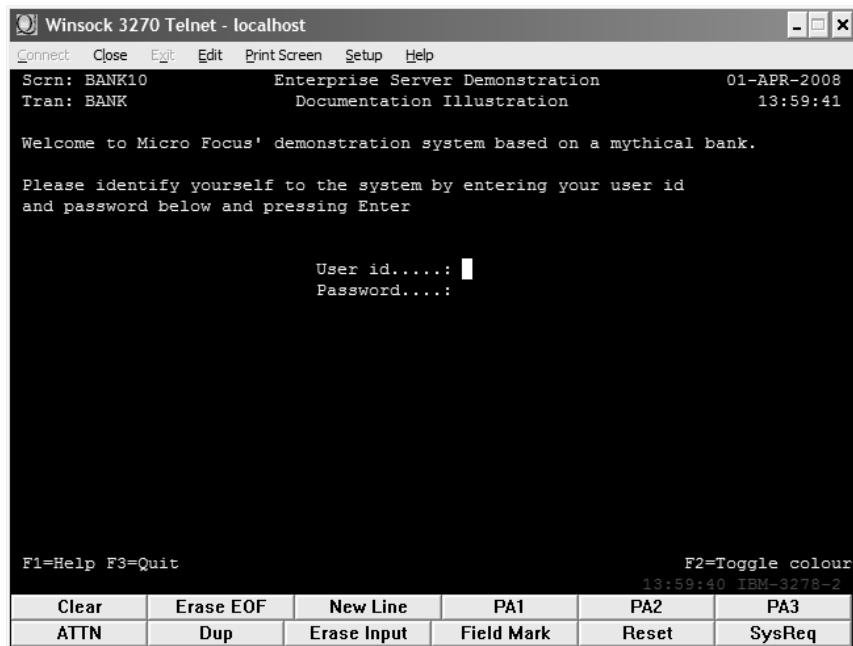
Type	Name	Current Status	Communications Processes	Licenses	Status Log	Objects	Description
MFS (MTO)	BANKDEMO	Started	tcp:192.168.1.13*:5000 ([HOL-FRITSV.microfocus.com]) ✓ 3 Listeners [Details]	* / 10	Server: [] CP 1: [] MD538011 Server started successfully 12:23:45 03/31/08 1 minute 25 seconds in "Started" state since 12:23:17 03/31/08 Started by admin ID "mfuser" using ES ID "(unknown)" under system ID "SYSTEM"	4 Services [Details] 3 Handlers [Details] 0 Packages [Add...]	Communications server for Web Services
MFS	ESDEMO	Stopped	tcp:192.168.1.13*:5000 ([HOL-FRITSV.microfocus.com]) 3 Listeners [Details]	/ 10	Server: [] OK	5 Services [Details] 2 Handlers [Details] 0 Packages [Add...]	Communications server for Web Services
MFCI	FSPRNNT	Registered	cotcp:192.168.1.13:2822 ([HOL-FRITSV.microfocus.com])				

The left sidebar contains navigation links: Home, Actions (Renew, Export, Import, Delete All), Configure (Options, Security), Display (Directories, Statistics, Sessions, Journal), and Help (This Page, Contents).

In order to verify the Bankdemo enterprise server (MTO) can access the SQL option database tables:

- Start a QWS3270 emulator.
- Type the transaction **BANK** followed by enter.

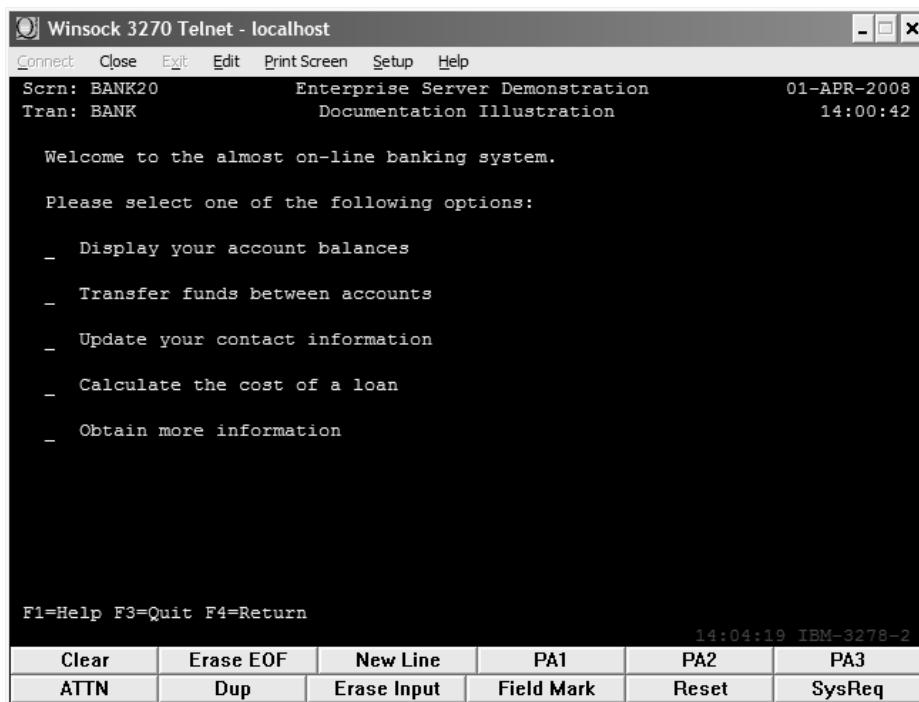
The following screen appears:



- Enter the user id and password then enter:

USERID: **B0001** PASSWORD: **X**

The following screen appears:



Note: This screen, BANK20 only appears if the connection to the database is successful.

Module 6

JCL configuration

Overview

In the last module we saw a CICS application able to run successfully using the database connectivity. This connectivity is defined using the XA option.

Objectives

After completing this module, you will be able to:

- Set up the JCL environment required.
- Add the appropriate batch initiators.

Configure Bankdemo Enterprise Server (JCL)

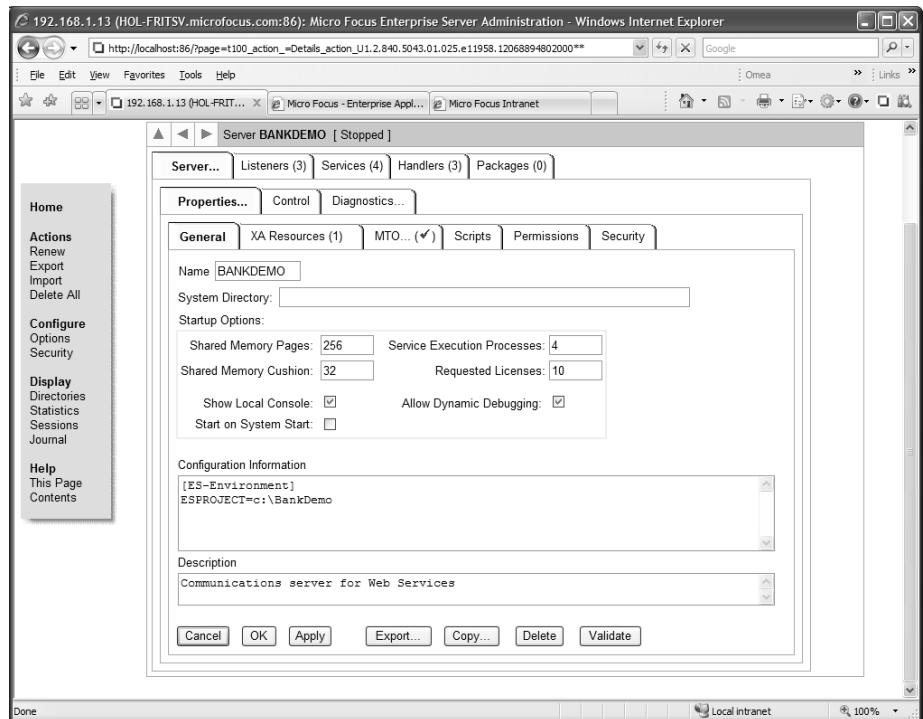
Start Enterprise Server Administration using one of the following methods:

- Select **Start, All Programs, Micro Focus Net Express 5.0, Configuration, Enterprise Server Administration.**
- Start a web browser and enter the URL [**http://localhost:86**](http://localhost:86).

The Enterprise Server Administration home page is displayed:

1 - 3 of 3 Servers						
Type	Name	Current Status	Communications Processes	Licenses	Status Log	Objects
MFES (MTO)	BANKDEMO	Stopped Start...	1 top 192.168.1.13*5000 (HOL-FRITSV.microfocus.com) 3 Listeners [Details]	- / 10	Server: [] CP 1: [] CASS70001! Server manager termination completed successfully 00:31:24 37 seconds in "Stopped" state since 00:31:20 04/03/08 Stopped by admin ID "mfuser" using ES ID "(unknown)" under ID SYSTEM	4 Services [Details] 3 Handlers [Details] 0 Packages [Add...]
MFES	ESDEMO	Stopped Start...	1 top 192.168.1.13*5000 (HOL-FRITSV.microfocus.com) 3 Listeners [Details]	- / 10	Server: [] CP 1: [] OK	5 Services [Details] 2 Handlers [Details] 0 Packages [Add...]
MFCC	FSPRNT	Registered	cottop:192.168.1.13:1034 (HOL-FRITSV.microfocus.com)			

- Select **Edit** to the left of the Bankdemo enterprise server. The following screen appears:

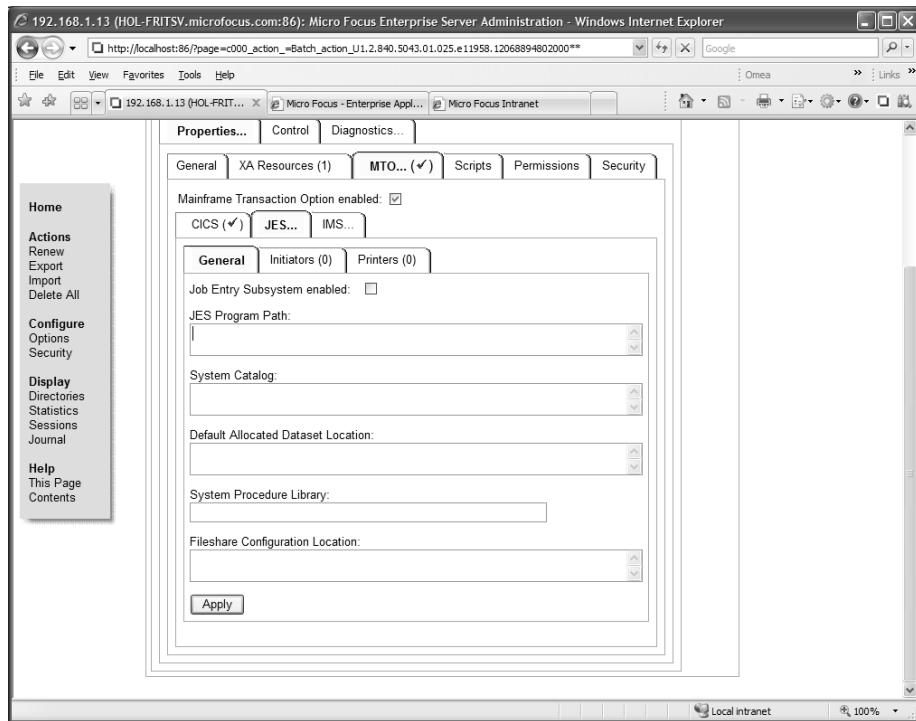


Note : In order to simplify additional configuration options we already set an environment variable in Module 4.

Configuration Information

```
[ES-Environment]
ESPROJECT=c:\BankDemo
```

- Select the MTO tab, followed by the JES tab:



The following must be configured in order to run the JCL for the Bankdemo application:

Job Entry Subsystem enabled

Check this to enable the Job Entry Subsystem for this server.

JES Path

Specify the path for the executable files that your JCL jobs will run.

\$ESPROJECT\Loadlib

System Catalog

Specify the full name (including the path) of your system catalog file. This file holds the details of data files, their attributes and locations.

\$ESPROJECT\CATALOG.DAT

Default Allocated Dataset Location

Specify the default directory to be used for the creation of new data sets.

\$ESPROJECT\Data

System Procedure Library

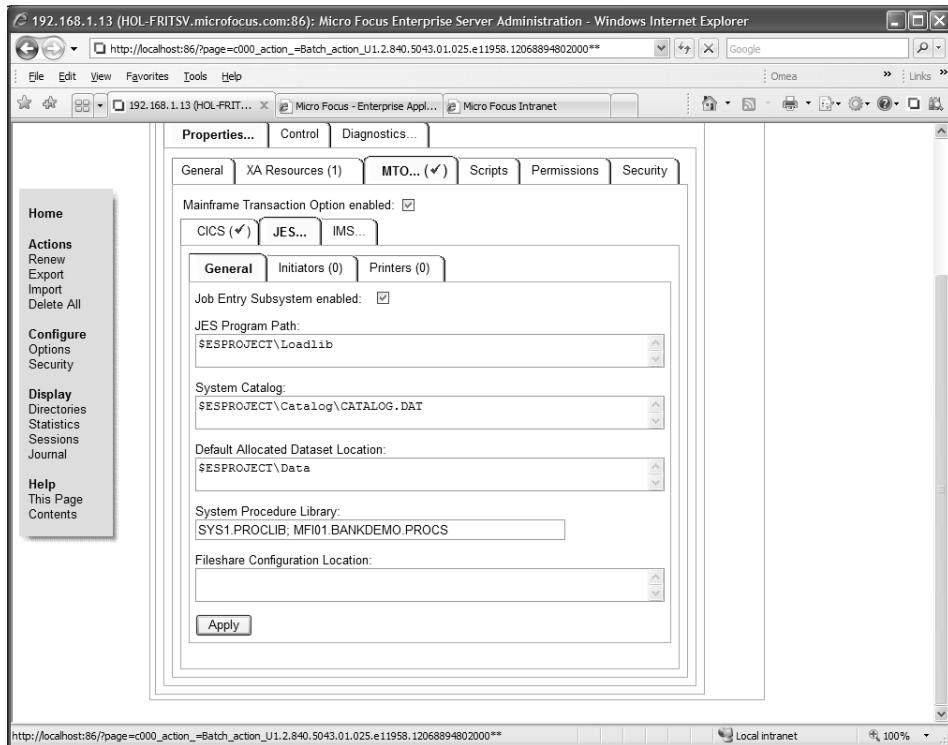
Specify the name of your system procedure library.

SYS1.PROCLIB; MFI01.BANKDEMO.PROCS

Note: Multiple paths must be separated with semi-colons on Windows or colons on UNIX.

Fileshare Configuration Location:

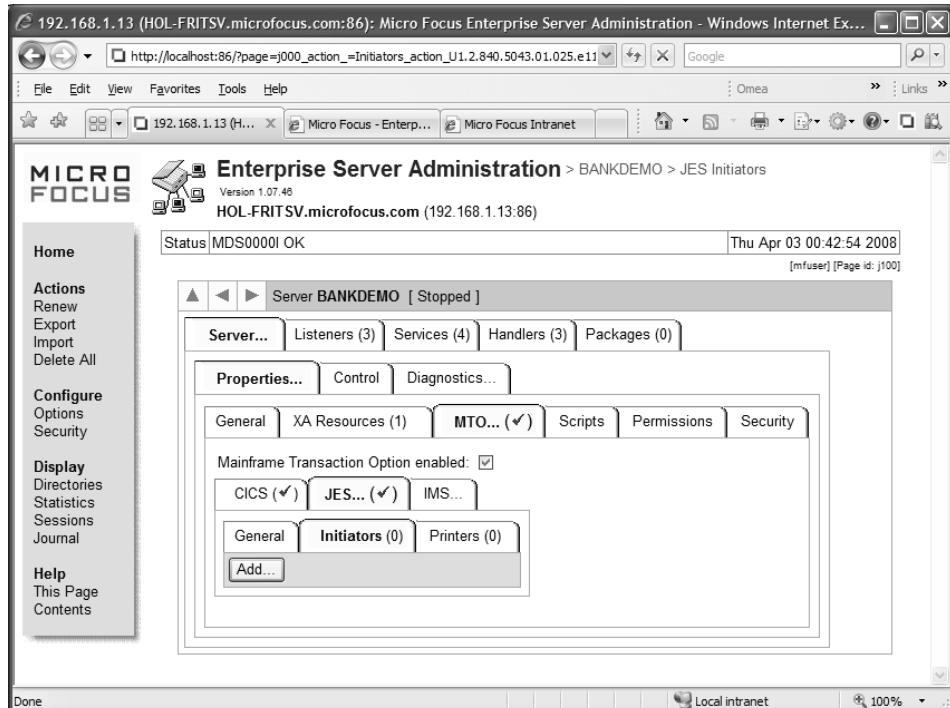
Leave this blank



- Click **Apply**.

Adding Batch Initiators

- Select the **Initiators** tab:



- Click **Add**.

Enter the details as described below:

Name field type: **INITA**

Class field type: **A**

Leave the **Description** field blank

- Click **Add**.

The screenshot shows the Micro Focus Enterprise Server Administration interface. The left sidebar contains navigation links: Home, Actions (Renew, Export, Import, Delete All), Configure (Options, Security), Display (Directories, Statistics, Sessions, Journal), and Help (This Page, Contents). The main content area displays the 'Enterprise Server Administration' page for 'BANKDEMO > JES Initiators'. The status bar at the top right shows 'Status MDS00001 OK' and the date 'Thu Apr 03 00:44:43 2008'. Below the status bar, there's a toolbar with icons for back, forward, search, and other functions. The central panel shows a tree view with 'Server...', 'Listeners (3)', 'Services (4)', 'Handlers (3)', and 'Packages (0)'. A sub-panel titled 'Properties...' has tabs for 'General', 'XA Resources (1)', 'MTO... (✓)', 'Scripts', 'Permissions', and 'Security'. Under 'XA Resources (1)', it lists 'CICS (✓)', 'JES... (✓)', and 'IMS...'. The 'Initiators (1)' tab is selected, showing a table with one row for 'INITA' with class 'A'. Buttons for 'Edit...' and 'Add...' are visible. At the bottom of the main panel, there are buttons for 'Done', 'Local intranet', and a zoom level of '100%'. The overall interface is a classic web-based administration tool.

In order for these settings to be used, the Bankdemo enterprise server must be restarted like we have already done a thousand times ☺

- Goto the **Home** page
- Select **Start:**
- Select **Ok**

on the startup page

The Enterprise Server Console Daemon (Console Log) appears:

```
Enterprise Server Console Daemon
676 BANKDEMO      XA structES1>, Registration Mode<Static>
676 BANKDEMO      00:50:00
5808 BANKDEMO JES0000051I Job Entry Subsystem <JES> services initialized
5808 BANKDEMO      00:50:00
676 BANKDEMO CASX00015I DB7R XA interface initialized successfully
676 BANKDEMO      00:50:00
          CASCD1060I JES Initiator created for Server BANKDEMO,
process-id = 5320 00:50:00
626 BANKDEMO CASSI5001I PLTPI - No PLT Specified 00:50:00
5808 BANKDEMO CASBJ0023I Batch initiator INITA: class(es) "A" 00:50:00
5320 BANKDEMO CASBJ0006I Batch initiator initialization started 00:50:00
5320 BANKDEMO CASBJ0005I Batch initiator started for job classes "A"
5320 BANKDEMO      00:50:01
4240 BANKDEMO CASSI1600I SEP initialization completed successfully
4240 BANKDEMO      00:50:01
5812 BANKDEMO CASSI1600I SEP initialization completed successfully
5812 BANKDEMO      00:50:01
2572 BANKDEMO CASSI1600I SEP initialization completed successfully
2572 BANKDEMO      00:50:01
1436 BANKDEMO CASCSS5100I Communications Process instance 01 is ready to
1436 BANKDEMO accept requests 00:50:01
4240 BANKDEMO CASSI5021I PLTPI Phase 2 - No PLT Specified 00:50:01
2572 BANKDEMO CASSI5021I PLTPI Phase 2 - No PLT Specified 00:50:01
5812 BANKDEMO CASSI5021I PLTPI Phase 2 - No PLT Specified 00:50:02
```

Note: Notice the Initiator messages.(CASBJ)

Module 7

Working with JCL

Overview

This module details how to associate an Enterprise Server with a Net Express project containing JCL functionality.

Objectives

After completing this module, you will be able to:

- Add JCL to a project.
- Associate the project with an enterprise server
- Submit JCL
- View the catalog.
- View the spool queue.

Working with JCL

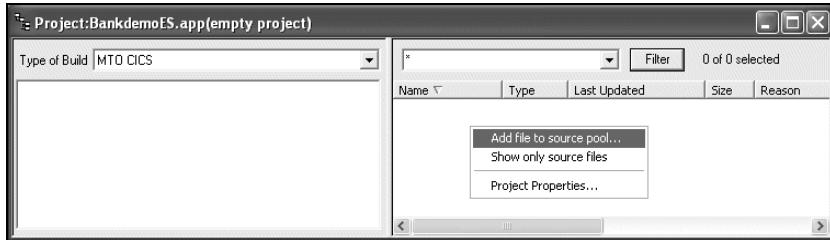
There are a number of ways to submit JCL. This section describes how to use Enterprise Server JCL Support from the Net Express IDE.

Using the Project-based Facilities you can:

- Start the server associated with the project
- Stop the server associated with the project
- View the catalog
- View the spool queues
- Submit a job to the server associated with the project
- Debug a job

Adding JCL to a project

- Right-click in the Source Pool and select Add file to source pool.

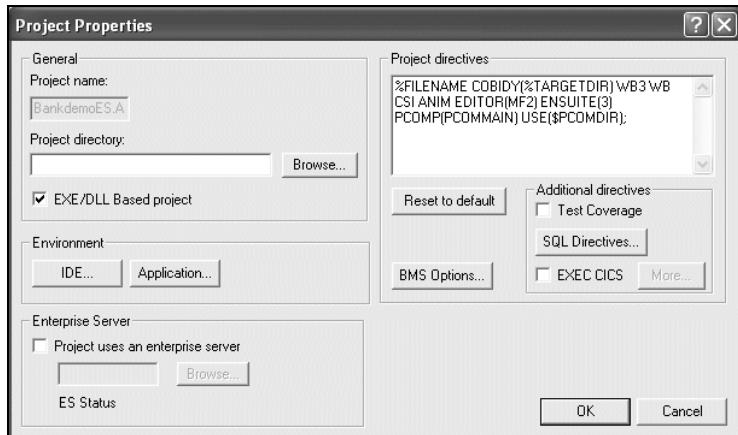


In the Add Files window, navigate to the folder that contains your files (e.g.: \Bankdemo\JCL). Select the desired file(s); press **Add**.

Leave the sources in their original location. Check **No to all** followed by **No**.

Associate the Project with an enterprise server

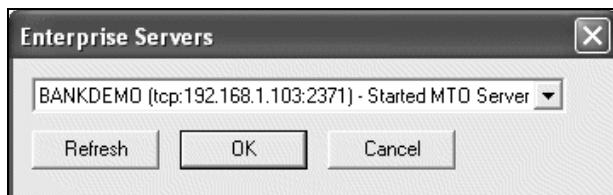
- Select **Project | Properties**



- Select **Project uses an enterprise server:**



- Select **Browse**, select BANKDEMO from the list:



- Click **OK**.



Submitting JCL

- Use the filter in the Source Pool to show only **JCL**:

A screenshot of the Micro Focus Studio interface showing a list of JCL files in the Source Pool. The filter at the top is set to ".JCL". There are three items selected, indicated by a grey background. The columns are Name, Type, Last Updated, Size, Reason, and Location.

Name	Type	Last Updated	Size	Reason	Location
ZBNKPRT1.JCL	Z/OS J...	Thu Feb 16 01:06:40...	738	Via absolute/relative path	C:\Bankdemo\JCL\
ZBNKINT1.JCL	Z/OS J...	Thu Feb 16 01:06:38...	1968	Via absolute/relative path	C:\Bankdemo\JCL\
ZBNKBAT1.JCL	Z/OS J...	Thu Feb 16 01:06:38...	2205	Via absolute/relative path	C:\Bankdemo\JCL\

- Highlight the job, **ZBNKINT1.JCL** followed by right-click:

ZBNKINT1.JCL will define GDG files.

A screenshot of the Micro Focus Studio interface showing a context menu for the ZBNKINT1.JCL file. The menu options are: Edit, Submit JCL (which is highlighted), Add file to source pool..., Show only source files, Remove from project, Project Properties..., Package selected files, and Copy.

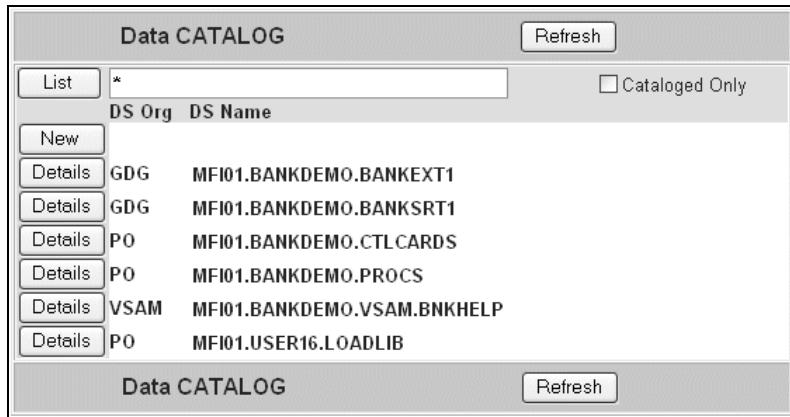
Name	Type	Last Updated	Size	Reason	Location
ZBNKPRT1.JCL	Z/OS J...	Thu Feb 16 01:06:40...	738	Via absolute/relative path	C:\Bankdemo\JCL\
ZBNKINT1.JCL	Z/OS J...	Thu Feb 16 01:06:38...	1968	Via absolute/relative path	C:\Bankdemo\JCL\
ZBNKBAT1.JCL	Z/OS J...	Thu Feb 16 01:06:38...	2205	Via absolute/relative path	C:\Bankdemo\JCL\

- Select **Submit JCL**.

Viewing the Catalog

The Catalog can be viewed from within the Net Express IDE.

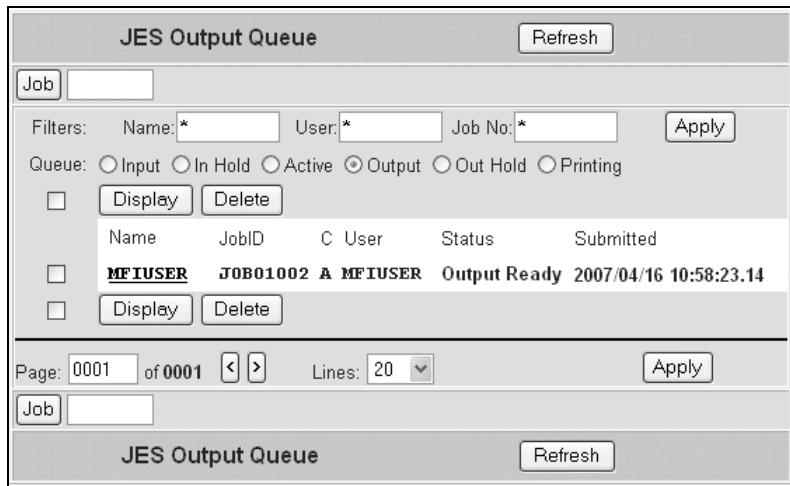
- Select **Tools | Enterprise Server | Catalog** from the menu bar:



Viewing the Spool

The Spool queue can be viewed from within the Net Express IDE.

- Select **Tools | Enterprise Server | Spool** from the menu bar:



- Highlight the job, **ZBNBAT1.JCL** followed by right-click:

The Extract step reads a DB2 table and writes a GDG file.

The next steps are a sort and a print of the output file.

The PRINT step will produce a print.

Click the Details button next to the PRINTOUT:

JOB01007						Refresh	
Job	00000						
JOB01007	Name: MFIH100	Status: Output Ready					
<input type="button" value="Hold"/>	Class: A	Priority: 00					
<input type="button" value="Update"/>	User: MFIH100						
<input type="button" value="Delete"/>	File: \$TXRFDIR/t000000086.t						
Details	Status: Ready	Class: X	DD Name: SYSOUT	Step: EXTRACT	Nbr. 1	Proc Step: UNLOAD	Records: 22
Details	Status: Ready	Class: X	DD Name: SYSTSPRT	Step: EXTRACT	Nbr. 1	Proc Step: UNLOAD	Records: 5
Details	Status: Ready	Class: X	DD Name: SYSOUT	Step: SORT	Nbr. 2		Records: 12
Details	Status: Ready	Class: X	DD Name: PRINTOUT	Step: PRINT	Nbr. 3	Proc Step: PRINT	Records: 575
Job	00000						
JOB01007						Refresh	

JOB01007						Refresh	JOB01007
Content-Type: text/plain							
1							
Micro Focus Demo Bank Statement of Account							
Printed: 16-APR-2007 11:24:10							
OFFRED BLOGGS MFIUSER 722 PARKLAND AVE MISSISSAUGA Ontario CANADA L5H3G8							
Account No.	Description	Date	Amount	Balance			
541374829	Last statement Investment	20-OCT-2000	3.60				
737590226	Last statement Checking	20-OCT-2000	54.80-				
450061494	Last statement Savings	20-OCT-2000	290.12				
	Christmas present 1	25-DEC-1999	1.00				
	Christmas present 2	25-DEC-1999	2.00				
	Christmas present 3	25-DEC-1999	3.00				
	Christmas present 4	25-DEC-1999	4.00				
	Christmas present 5	25-DEC-1999	5.00				
	Transferred to a/c 737590226	26-JUL-2004	10.00-				
	Transferred from a/c 450061494	26-JUL-2004	10.00				
	Transferred to a/c 737590226	27-JUL-2004	200.00-				
	Transferred from a/c 450061494	27-JUL-2004	200.00				
	Transferred to a/c 737590226	07-SEP-2004	250.00				
	Transferred from a/c 450061494	07-SEP-2004	250.00				

Total transactions						15.00	

Module 8

Dynamic Debugging

Overview

This module describes how to use Enterprise Server Dynamic Debugging.

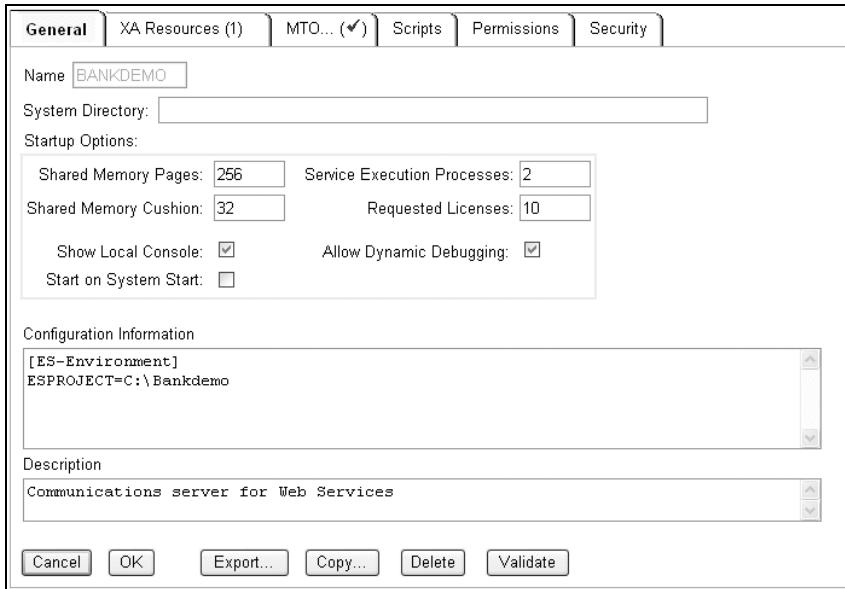
Objectives

After completing this module, you will be able to:

- Configure an Enterprise Server to enable dynamic debugging.
- Animate jobs through the Server.

Using Enterprise Server Dynamic Debugging

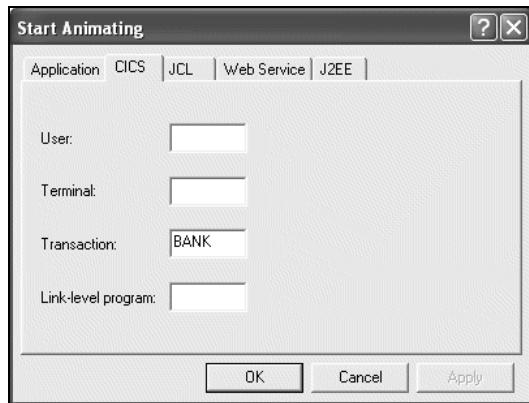
Enterprise Server Dynamic Debugging requires **no** changes to your program code. The Net Express project must be associated with the enterprise server on which your CICS / JCL application will run. You must also ensure that the enterprise server is configured to enable dynamic debugging:



“Allow Dynamic Debugging” needs to be checked.

Animating CICS

- Load the **BankdemoES** project. Ensure the Bankdemo enterprise server is started.
 - Select **Start Animating** from the menu bar, the following dialog appears:



- Enter the **Bank** transaction followed by **OK**.

The Animator is now in a wait state.

- Start a QWS3270 emulator.
 - From the QWS3270 menu select **Connect**.
 - Type the transaction **BANK** followed by enter.

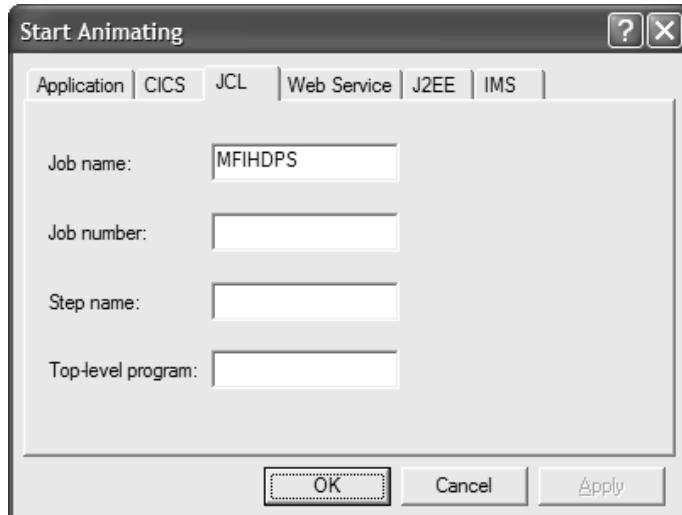
Control is now passed to the Animator:

```
SBANKOOP.CBL
* Store our transaction-id
***** MOVE EIBTRNID TO WS-TRAN-ID. *****

* If we have a commerces then its either not the first time in
* from a terminal or we have come from other than a terminal so
* display the call type so we know where we came from
***** IF EIBCALEN IS NOT LESS THAN 8
      IF CALL-TYPE=CICSICSI OR
          CALL-TYPE=WEBSERV
          MOVE LK-CALL-TYPE TO WS-INPUT-SOURCE-MSG-CALL-TYPE
          EXEC CICS WRITE OPERATOR
              TEXT(WS-INPUT-SOURCE-MSG)
*****
```

Animating JCL

- Load the **BankdemoES** project. Ensure the Bankdemo enterprise server is started.



Select **Start Animating** from the menu bar, the following dialog appears:

Enter the job name **MFIHDPS** followed by **OK**.

- Submit the JCL **ZBNKBAT1.JCL** via the Net Express IDE.

Control is now passed to the Animator:

```

008600 PROCEDURE DIVISION USING LK-DATA.
008700
008800
008900
009000
009100
009200
011700
011800
011900
012000
012100
012200
012300
012400

    MOVE 'O' TO WS-ZBNKRPC1-IND.
    MOVE LOW-VALUES TO WS-ZBNKRPC1-DATA-PT1.
    MOVE HIGH-VALUES TO WS-ZBNKRPC1-DATA-PT2.

    PERFORM EXTRACT-OPEN.

    PERFORM SOURCE1-OPEN.
    PERFORM UNTIL IO-REQUEST-STATUS-EOF
        IF NOT IO-REQUEST-STATUS-EOF
            PERFORM SOURCE1-READ
            IF IO-REQUEST-STATUS-OK

```

Module 9

Extending existing CICS applications

Overview

This module describes how to use the Interface Mapping Toolkit (IMTK) to extend an existing CICS application running in Enterprise Server/MTO using Web services.

Objectives

After completing this module, you will be able to:

- Select suitable subroutines for IMTK processing.
- Create a service interface.
- Add BMS screens to the service interface group.
- Map the interface fields.
- Configure the service deployment.
- Deploy the service.
- Generate test clients.

Extending Migrated CICS Applications

The Interface Mapping Toolkit (IMTK) can be used to extend an existing CICS application running in Enterprise Server/MTO using Web services.

The IMTK can be used to

- Create a new Service Interfaces Group to hold the service interface that you will create to extend the CICS application
- Add BMS screens to the Service Interfaces Window
- Create a new service interface which will extend the CICS application as a Web service
- Create operations and map the CICS application screen fields to external interface fields
- Deploy the service to Enterprise Server
- Generate test clients
- Run the test client

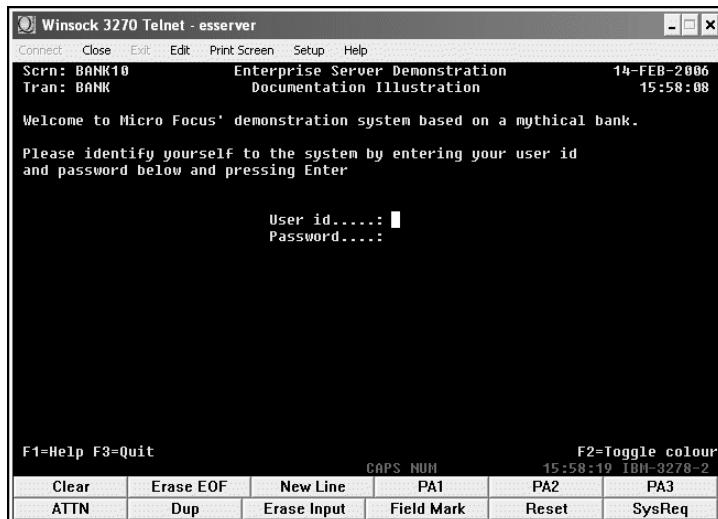
Identify suitable subroutine

The Bankdemo application has a subroutine to determine the cost of a loan.

Run the Bankdemo application:

- Start a QWS3270 emulator.
- From the QWS3270 menu select **Connect**.
- Type the transaction **BANK** followed by enter.

The following screen (**BANK10**) appears:

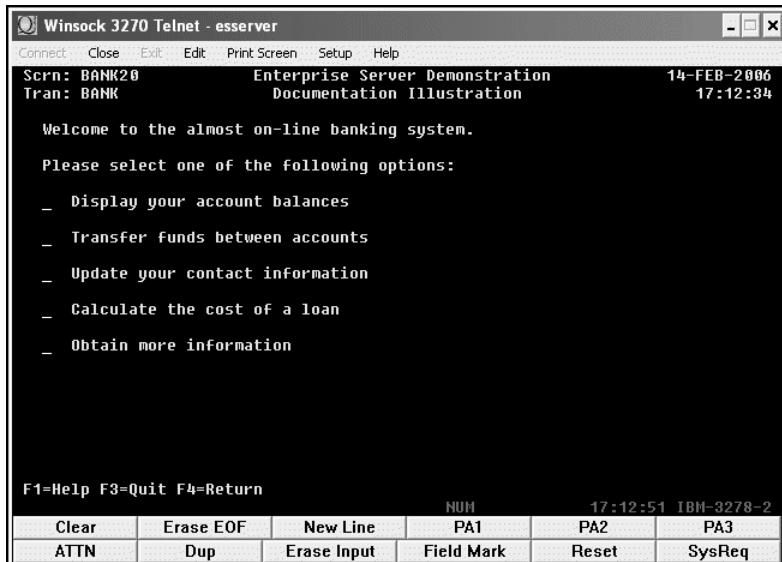


- Enter the user id and password then enter:

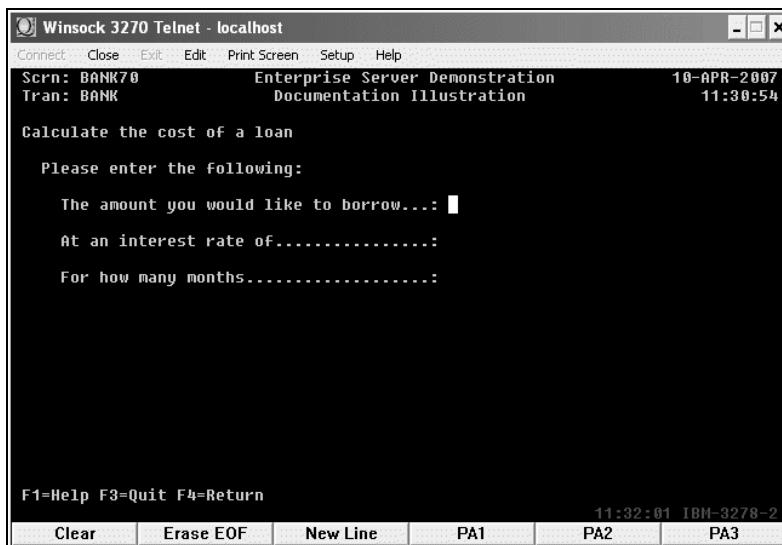
USERID: **B0001**

PASSWORD: **X**

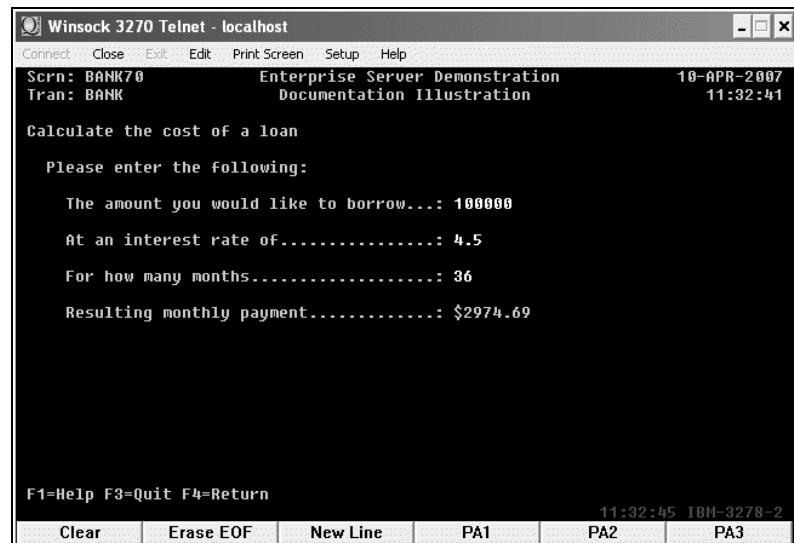
The following screen (**BANK20**) appears:



- Select **Calculate the cost of a loan** from the menu. The following screen (**BANK70**) appears:



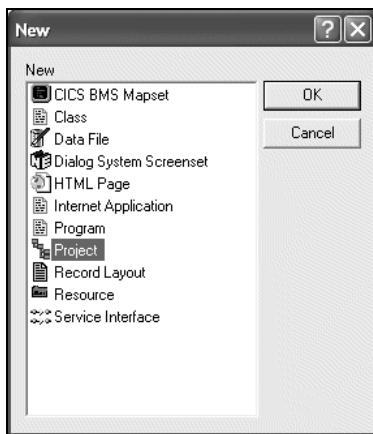
- Enter the following values followed by enter:
Amount = 100000
Interest = 4.5
Months = 36
- The **BANK70** screen is refreshed with the payment displayed:



Creating a Net Express Project

- Start Net Express.
- Select **File, New**.

Select **Project**:

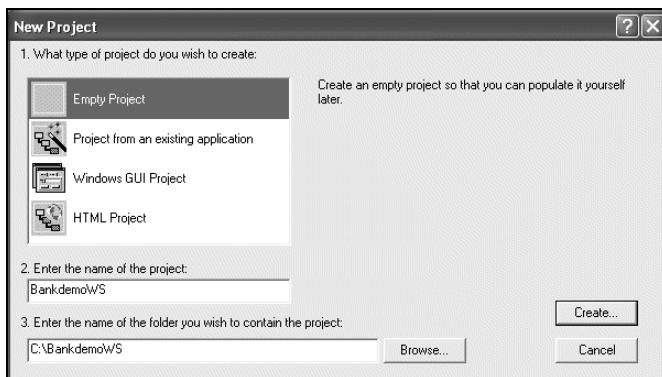


- Click **OK**. The New Project wizard is displayed:

Select Empty Project

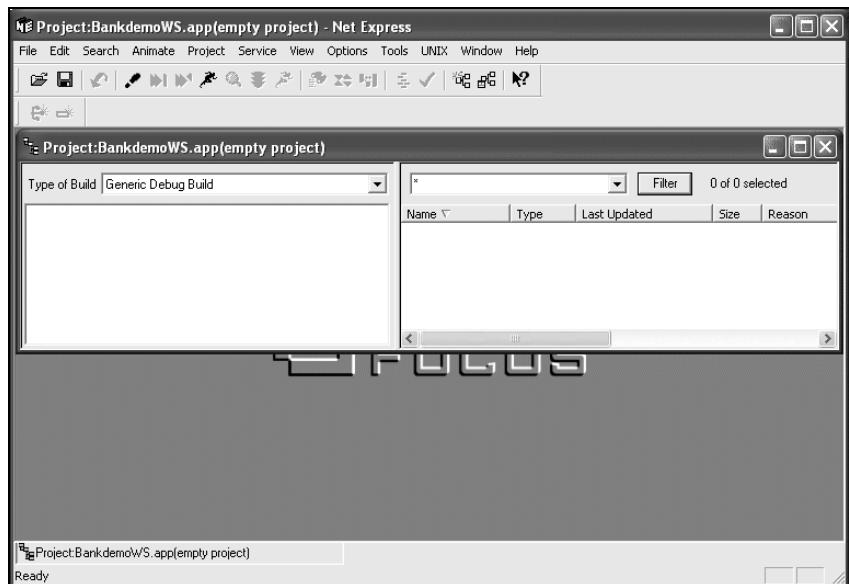
Enter a **name** for your project – **BankdemoWS**

Enter the **project folder** – **C:\BankdemoWS**



- Click **Create**.

Respond to any additional window prompts as required. When complete, the project window displays.



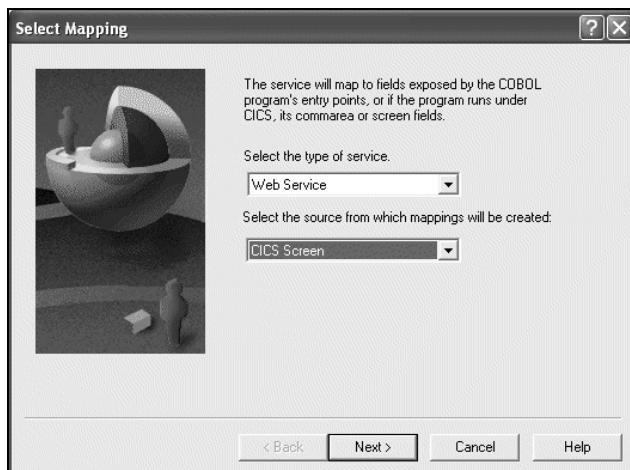
Create a new Service Interface

- Select **File, New.**

Select Service Interface:

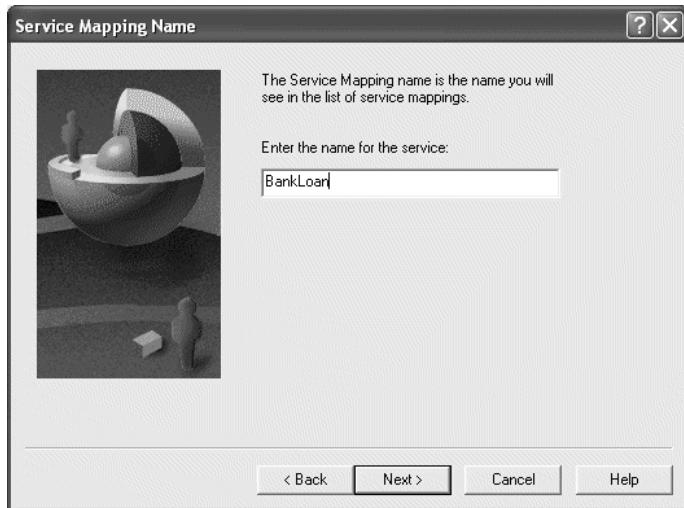


- Click **OK**.
- Select the type of service = **Web Service**
Select the source from which mappings will be created = **CICS Screen**

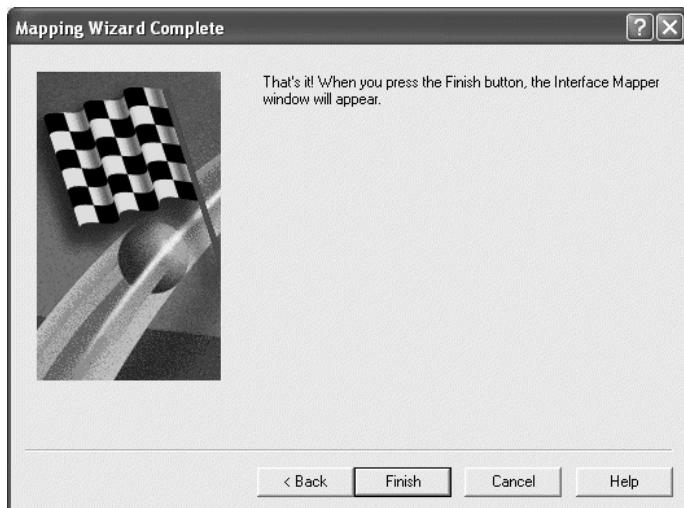


- Click **Next**.

- Enter **BankLoan** as the name of the service:

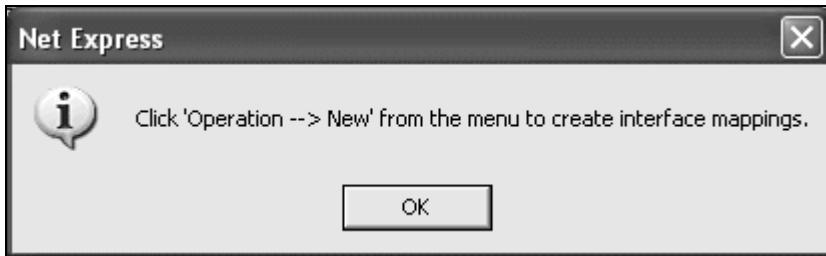


- Click **Next**.
- The Wizard Complete dialog appears:



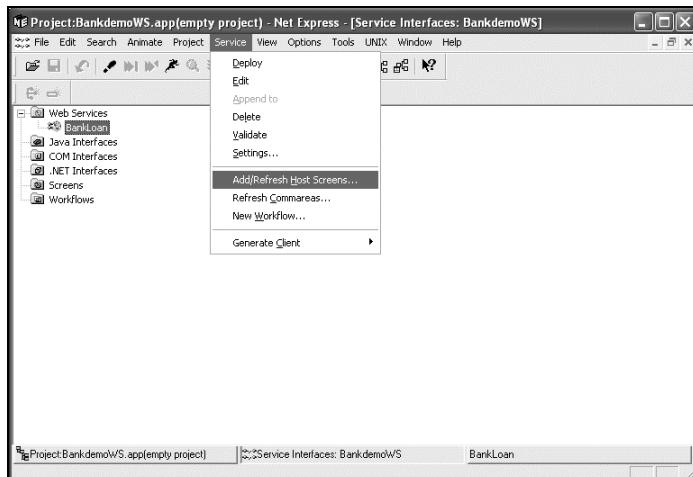
- Click **Finish**.

- Dismiss the Create Operation reminder message.



The BMS screens need to be added to the Service Interface Group.

- From the **Service** menu select **Add/Refresh Host Screens**:



- The BMS maps required are:

MBANK10

MBANK20

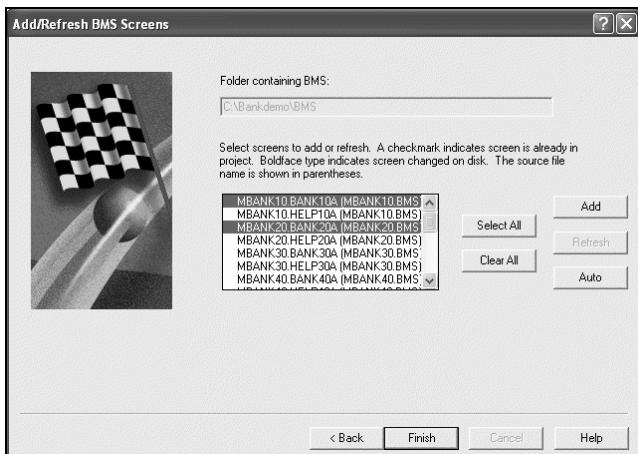
MBANK70

- Select **BMS Screens from folder**.

Use the Browse button to navigate to the C:\Bankdemo\BMS folder:

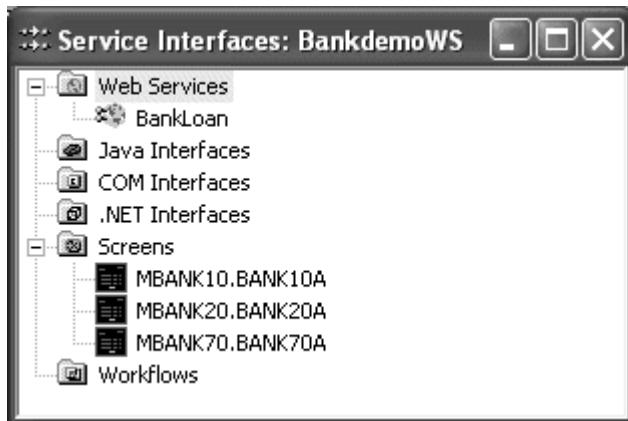
- Click **Next**.

- A dialog showing all of the maps and mapsets appears:



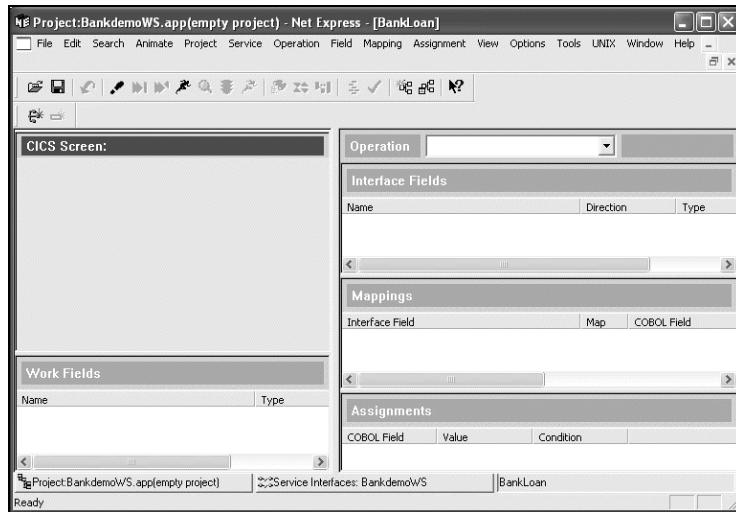
- Select **MBANK10, MBANK20 and MBANK70**.
- Click **Add**, followed by **Finish**.

The Service Interface window is updated to include the selected BMS screens:



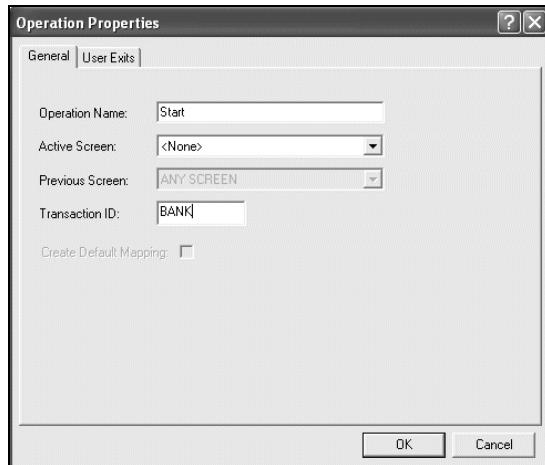
Creating Operations

- Focus on the Interface Mapper window:



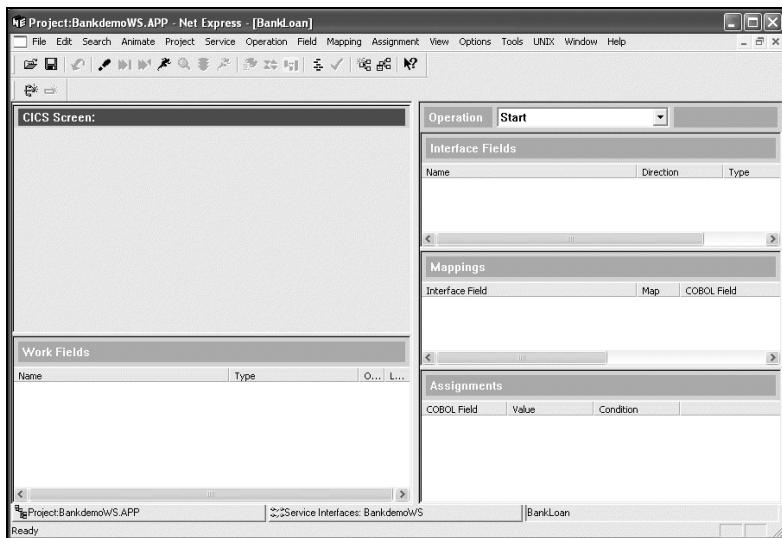
The first Operation is used to launch the **BANK** transaction.

- Select **Operation** from the menu bar followed by **New (right click on “Operations”)**:



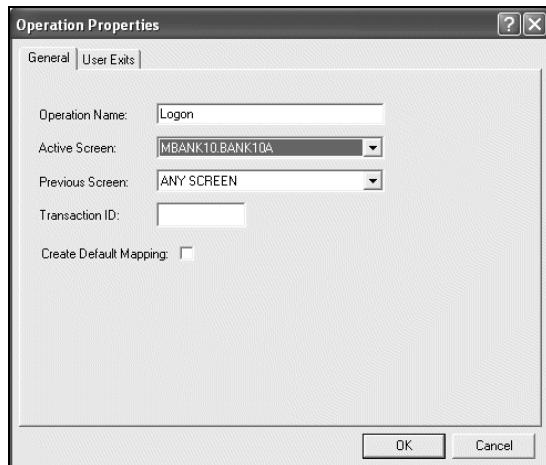
- Name the operation **Start** and enter **BANK** as the transaction ID, followed by **OK**.

The interface Mapper is updated:

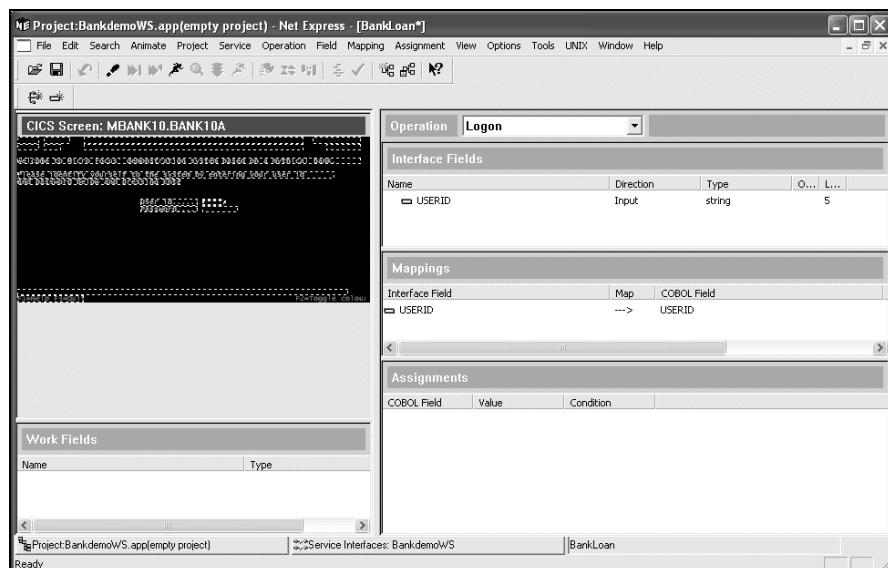


Create an Operation to enter the User ID and Password.

- Select **Operation** from the menu bar followed by **New**:



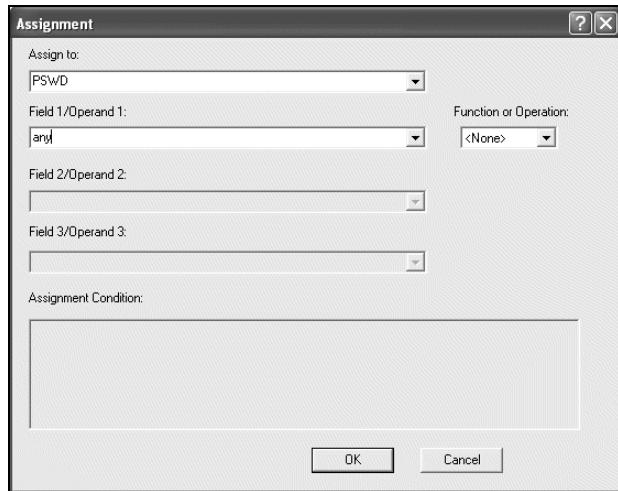
- Name the operation **Logon** and enter **MBANK10.BANK10A** as the active screen, followed by **OK**. (The previous screen can be left as ANY SCREEN).
 - In order to create an interface field mapped to the USER ID, select the **USERID** field and drag it to the Interface Fields pane.



The field can be renamed if necessary by double-clicking and editing the properties.

The password can be handled by assigning a value to the PSWD field rather than assigning an interface mapping.

- Right-click in the **Assignments** pane, and choose **New Assignment**.
Select the PSWD field from the dropdown.
Type the literal '**any**' in the Field 1/Operand 1 field:



- Click **OK**.

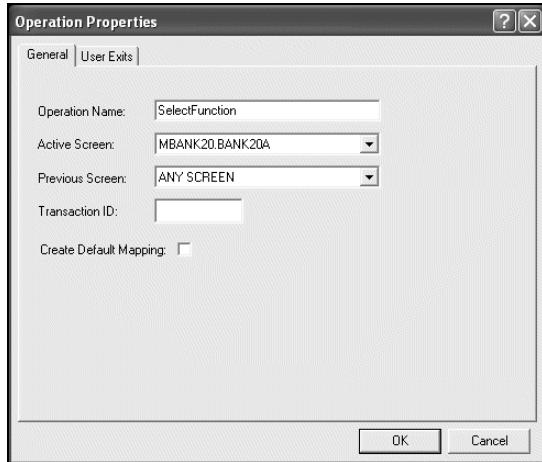
Specify an **Attention ID**.

- Right-click in the **Assignments** pane, and choose **New Assignment**.
Select the ATTENTION ID field from the dropdown.
Select **ENTER** in the Field 1/Operand 1 field.

COBOL Field	Value	Condition
PSWD	"any"	
ATTENTION ID	ENTER	

The next screen in the application flow is **MBANK20.BANK20A**.

- Select **Operation** from the menu bar followed by **New**:



- Name the operation **SelectFunction** and enter **MBANK20.BANK20A** as the active screen, followed by **OK**. (The previous screen can be left as ANY SCREEN).



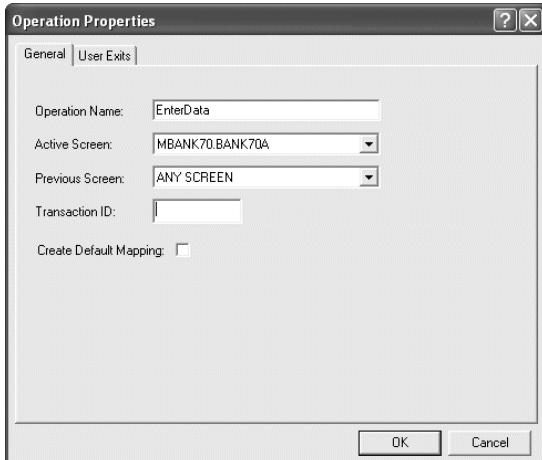
- Right-click in the **Assignments** pane, and choose **New Assignment**. Select the **SEL4IP** field from the dropdown. Enter the literal **S** in the Field 1/Operand 1 field.

- Right-click in the **Assignments** pane, and choose **New Assignment**. Select the ATTENTION ID field from the dropdown. Select **ENTER** in the Field 1/Operand 1 field.

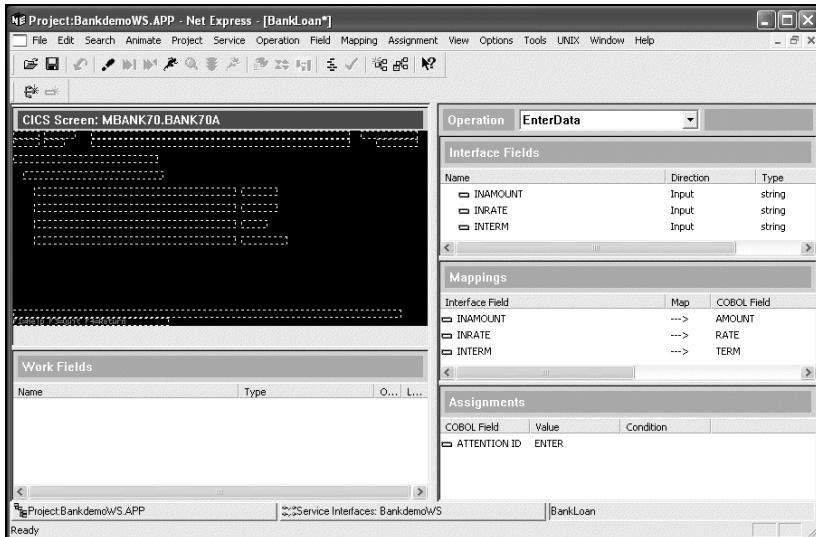
Assignments		
COBOL Field	Value	Condition
SEL4IP	"S"	
ATTENTION ID	ENTER	

The next screen in the application flow is **MBANK70.BANK70A**.

- Select **Operation** from the menu bar followed by **New**:



- Name the operation **EnterData** and enter **MBANK70.BANK70A** as the active and previous screen, followed by **OK**. (The previous screen can be left as ANY SCREEN).
- In order to create an interface fields mapped to the **AMOUNT**, **RATE** and **TERM** fields, select the fields and drag them to the Interface Fields pane.

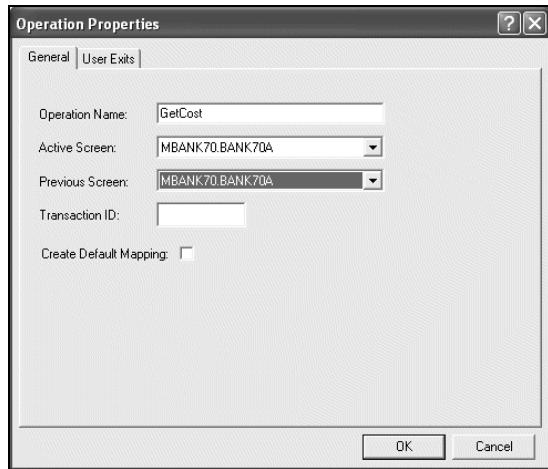


- Right-click in the **Assignments** pane, and choose **New Assignment**. Select the ATTENTION ID field from the dropdown. Select **ENTER** in the Field 1/Operand 1 field.

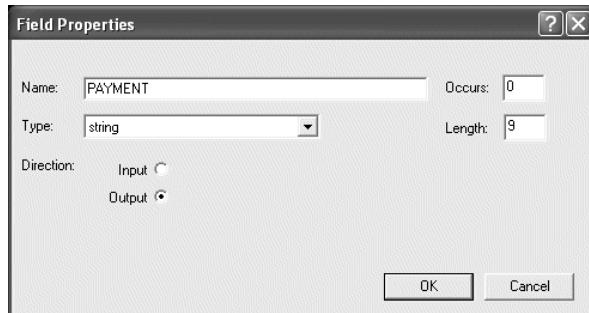
Assignments		
COBOL Field	Value	Condition
ATTENTION ID	ENTER	

The next screen in the application flow is **MBANK70.BANK70A**, this screen is both the input and output screen. An operation needs to be added in order to return the payment value.

- Select **Operation** from the menu bar followed by **New**:



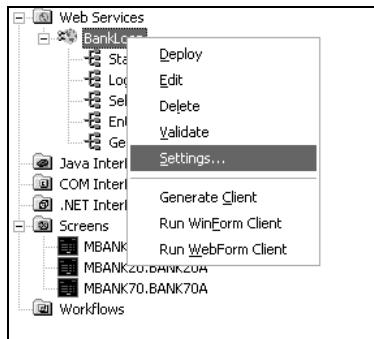
- Name the operation **GetCost** and enter **MBANK70.BANK70A** as the active and previous screen, followed by **OK**.
- In order to create an interface field mapped to the **PAYMENT** field, select the field and drag it to the Interface Fields pane.
- Change the mapping to Output:



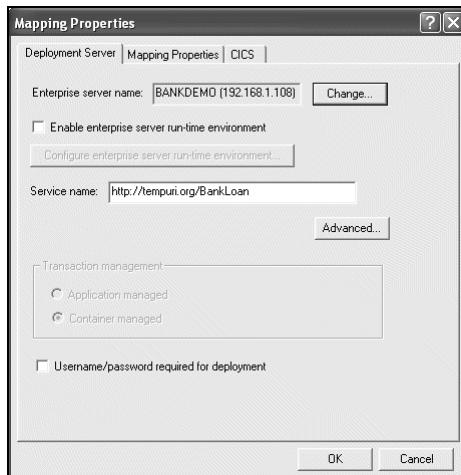
Configure the Service Deployment

Before deploying the service first check the configuration.

- Right-click the BankLoan Web Service in the Service Interfaces window, followed by **Settings**:



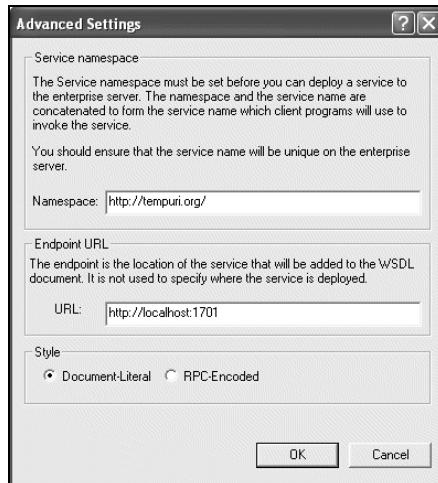
- Ensure that the Bankdemo enterprise server is running.
- Click **Change**:



- Select the Bankdemo enterprise server:

Server	Service Name	Description	Service Status	Endpoint	Listener Status	OK
ESDEMO	Deployer	Deployment file-upload ser...	Available	tcp:0.0.0.0	Stopped	<input type="button" value="Cancel"/>
BANKDEMO	Deployer	Deployment file-upload ser...	Available	tcp:192.168.1.108:1072	Started	<input type="button" value="OK"/>

- Click the **Advanced** button to change the port number of the Endpoint URL to correspond to Web Services Listener used by the Bankdemo enterprise server:



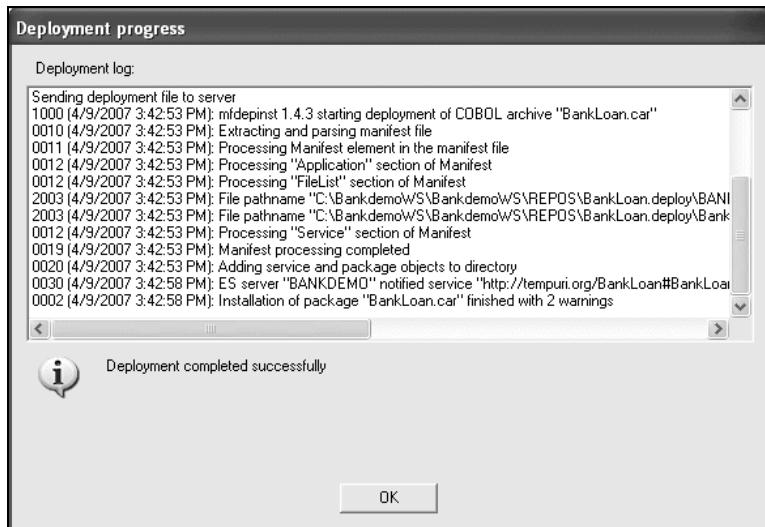
	Name	Address	Status	Last Status Change	Status Log	Conversation Type	Custom Configuration	Description
[Edit...]	Web Services	tcp:192.168.1.108*:1071*(mfuserlab.hsd1.co.comcast.net.)	Started	04/09/07-15:35:12	OK	Web Services and J2EE		Web Services via HTTP/SOAP
[Edit...]	Web	tcp:192.168.1.108*:1072*(mfuserlab.hsd1.co.comcast.net.)	Started	04/09/07-15:35:12	OK	Web	[virtual paths] cgi=<ES>\bin uploads=<ES>/deploy docs=<ES>/help [allow] cgi;mfdeploy.exe uploads=.txt .car *.wsdl	Basic HTTP web server
[Edit...]	TN3270	tcp:192.168.1.108*:5349*(mfuserlab.hsd1.co.comcast.net.)	Started	04/09/07-15:35:12	OK	TN3270		Default TN3270 listener

Deploying the Service

- Right-click the BankLoan Web Service in the Service Interfaces window, followed by **Deploy**:



- The following dialog appears:



- Click **OK**.

The service has now been successfully deployed.

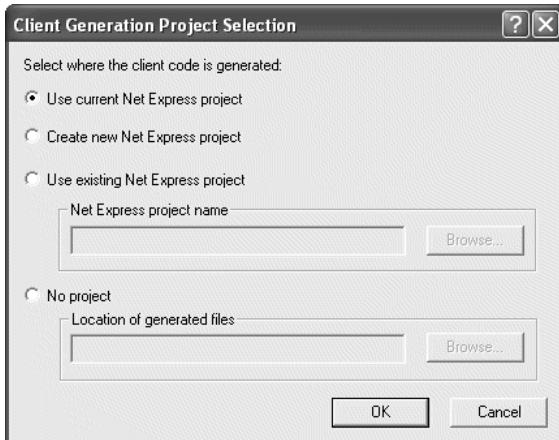
Generating Test Clients

In order to test the web service a number of test client programs can be generated.

- Right-click the BankLoan Web Service in the Service Interfaces window, followed by **Generate Client**:



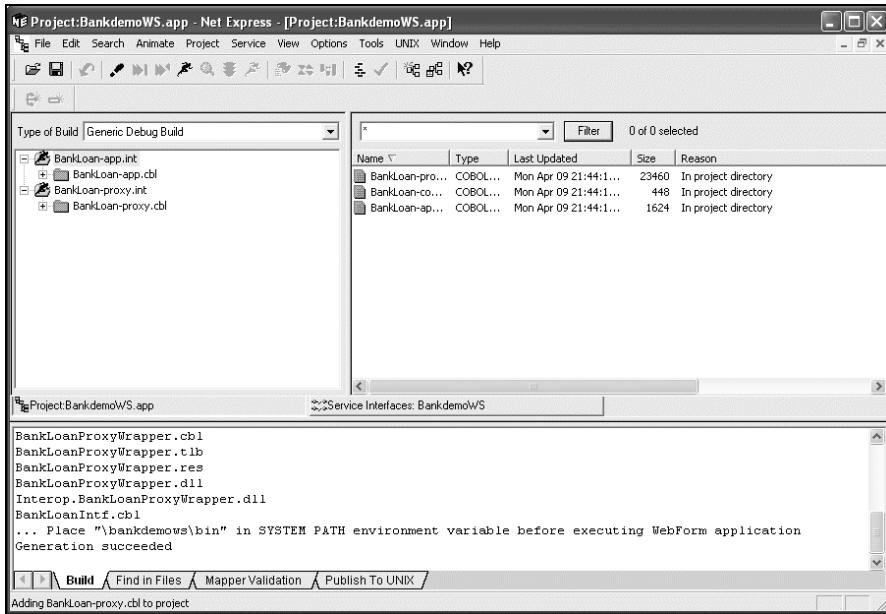
- The following dialog appears:



- Select **Use current Net Express project**.

Three client programs are generated; Character (accept/display), WinForm and WebForm.

The character client application is added to the Net Express project:



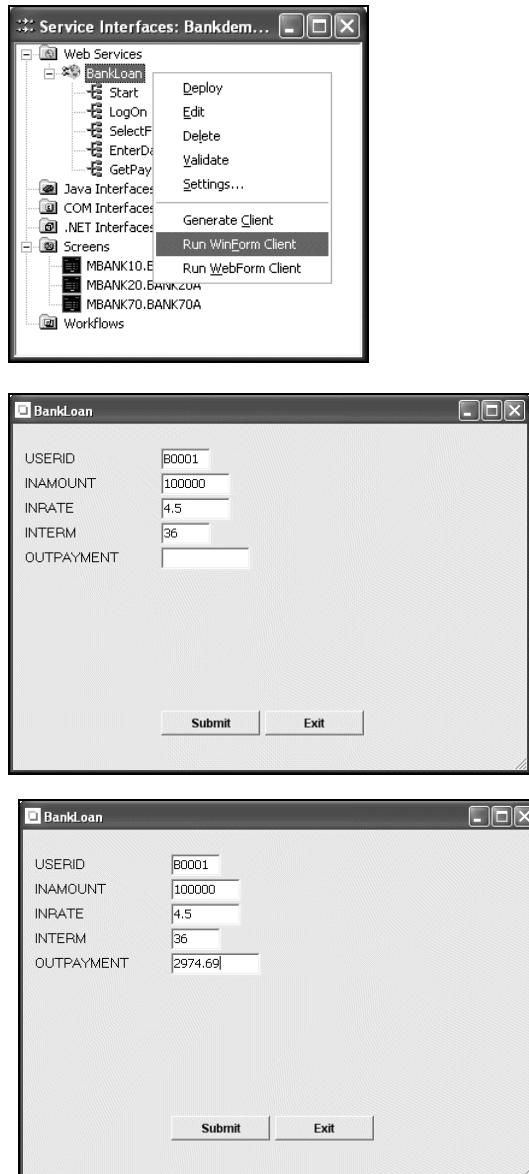
The other two client types are generated and placed in sub-folders and can be edited within Microsoft Visual Studio.

- Rebuild the Net Express project and run the BankLoan-app.int:



In order to run the WinForm client:

- Right-click the BankLoan Web Service in the Service Interfaces window, followed by **Run WinForm Client**:



In **ES11-EXTEND.doc**, you will get an **Error**. The console log will contain something like “070608 15240655 956 BANKDEMO CASMG9999E KC0027,Error executing service 'http://tempuri.org/BankServ#BankServ' Execution error : file 'C:\Program Files\Micro Focus\Studio 5.0\Base\BIN\MER0ADSX.gnt”. This is a **bug** feature of the product. The solution is to remove the PPT entry for MBANK10. See http://supportline.microfocus.com/mf_kb_display.asp?kbnumber=24334.