Addendum to

FRAMES Internet Database Tools: Database Owner's Tool (DOT), Data Extraction Tool (DET), and Database Client Editor (DCE)

(Review comments inserted by Ron Kickert)

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5.0 Testing Approach and Results

As noted previously, the FRAMES Internet Database Tools are programs that will enable the FRAMES system to access data from MS Access 97 or Access 2000 databases regardless of table structure, formats, and location. The FRAMES Internet Database Tools are comprised of three components: the DOT, the DET, and the DCE. Each component has specific requirements that it must meet independent of the other components. For this reason, each component was tested separately

This section describes the testing conducted for the DOT, DET, and DCE. It includes summaries of the requirements on which testing was based and descriptions of test cases, and it lists the results of their implementation. One test case for the DCE was generated through the FRAMES User Interface (FUI). The GID file is included with the test package. The GID file generated through independent testing should match this file.

5.1 DOT   DATABASE OWNERS TOOL

The DOT allows the database owner to specify the mapping between parameters needed by models in FRAMES and their locations in their database. The mapping specified is used to create the database extraction plan.

5.1.1 Summary of Requirements

Requirements for the DOT are described in Section 2.0. of this document. These requirements were reworded, as necessary, to create a list of fundamental requirements that are suitable for testing. Table 5.1 lists these requirements. To ensure that the DOT meets the requirements listed in Table 5.1, test cases were developed to check performance. Table 5.2 shows the relationship between these requirements and the test cases described in Section 5.1.2.

Table 5.1. Fundamental Requirements for Testing the DOT

Requirement Number	Requirement
1	The DOT shall connect to any MS Access 97 or Access 2000 database.
2	The DOT shall be accessible on a server via the Internet.
3	The DOT shall ask for user login credentials for security.
4	The DOT shall provide a web-page interface for creating stored execution plans.
5	The DOT shall provide a web-page interface for creating and storing ODBC connection information for the source database.
6	The DOT shall provide a web-page interface for creating and storing DIC connection information for FRAMES datasets.
7	The DOT shall provide the capability to test and modify extraction plans.
8	The DOT shall be used by the database owners and will assist them in mapping the data from the source database into FRAMES dataset(s) outlined by the DIC file.

Requirement Number	Requirement
9	The DOT shall be capable of joining data from separate tables within a database when searching for requested data.
10	The DOT shall be capable of filtering out non-unique data when the option is selected through the DOT user interface.
11	The DOT shall allow the user to enter data necessary to specify the name and location of a database.
12	The DOT shall allow the user to choose the FRAMES dataset DIC to map to (Note: No checking is performed to ensure that the DIC is in the correct format).
13	The DOT shall read a DIC file to determine parameter list.
14	The DOT shall read a DIC file to determine parameter correlations.
15	The DOT shall allow the user to specify how parameters are mapped.
16	The DOT shall create an extraction plan(s) in the form of an SQL statement with replaceable parameters (keys).
17	The DOT shall create an extraction plan(s) capable of retrieving a list.
18	The DOT shall create an extraction plan(s) capable of retrieving related data from multiple tables.
19	The DOT shall create a stored extraction plan that may have one or more key values associated with it.
20	The DOT shall provide error messages when DIC or MDB files are not found.
21	The DOT must operate within FRAMES under Windows-95 or higher.
22	The DOT will allow the user to specify the units of the relevant fields to be extracted in the extraction plan.
23	The DOT will execute unit conversions on user-specified fields when testing an extraction plan.

Table 5.2. Relationship Between Test Cases and DOT Fundamental Requirements

		Test Case Name (DOT_xx)
		01	02	03	04	05	06
Requirements	1	X					
	2	X					
	3	X					
	4	X					
	5	X					
	6	X					
	7	X					
	8	X					
	9			X			
	10				X		
	11	X					
	12	X					
	13	X					
	14	X					
	15	X					
	16						X
	17	X					
	18			X			
	19		X	X			
	20					X	
	21	X					
	22		X	X			
	23		X	X			

5.1.2 TEST CASES

5.1.2.1 DOT_01

5.1.2.1.1 Description and Rationale

This test case addresses the capability of the DOT to allow the user to map a DIC file and a database and its parameters. The parameter being mapped will have **one key parameter** associated with it. This test case also addresses the basic functionality of the DOT; therefore, several of the other requirements are addressed in this case.   The requirements addressed are listed below.   These requirement numbers are referenced in the results section (Note: the requirement numbers used below do not correspond to the requirement numbers listed in Table 5.1).

1) The DOT shall connect to any MS Access 97 or Access 2000 database. The DOT shall be accessible on a server via the Internet.
2) The DOT shall ask for user login credentials for security.
3) The DOT shall provide a web-page interface for creating stored execution plans.
4) The DOT shall provide a web-page interface for creating and storing ODBC-connection information for the source database.
5) The DOT shall provide a web-page interface for creating and storing DIC connection information for FRAMES datasets.
6) The DOT shall provide the capability to test and modify extraction plans.
7) The DOT shall be used by the database owners and will assist them in mapping the data from the source database into FRAMES dataset(s) outlined by the DIC file.
8) The DOT shall store the database scheme (structure), DIC scheme, and extraction plans.
9) The DOT shall be capable of joining data from separate tables within a database when searching for requested data.
10) The DOT shall be capable of filtering out non-unique data when the option is selected through the DOT user interface.

11) The DOT shall allow the user to enter data necessary to specify the name and location of a database.
12) The DOT shall allow the user to choose the FRAMES dataset DIC to map to.
13) The DOT shall read a DIC file to determine parameter list
14) The DOT shall read a DIC file to determine parameter correlations.
15) The DOT shall allow the user to specify how parameters are mapped.
16) The DOT shall create an extraction plan(s) in the form of an SQL statement with replacable parameters (keys).
17) The DOT shall create an extraction plan(s) capable of retrieving a list.
18) The DOT shall create an extraction plan(s) capable of retrieving related data from multiple tables.
19) The DOT shall create stored extraction plan that may have one or more key values associated with it.
20) The DOT shall provide error messages when DIC or MDB files are not found.
21) The DOT must operate within FRAMES under Windows-95 or higher.

5.1.2.1.2 Input Data

This test case requires that you use the dictionary file "EBF.DIC" and the database "DOTDB01.MDB." Both of these files should be located on a computer that can be mapped and accessed through the Internet. All other input will be described in the procedure section below.

5.1.2.1.3 Expected Results

It is expected that the DOT will execute without error and will meet all of the requirements listed in Section 5.1.2.1.1.

5.1.2.1.4 Procedure

Place the DOT server on a computer that can be accessed by the computer that will be used to carry out this test plan. Then bring up a browser (i.e., Netscape, Internet Explorer, etc.) and type in the URL to map the computer and folder location. If the DOT server is located on a computer that is behind a firewall, which is recommended, you will be prompted to enter a user ID and password. Enter those and click on the "Ok" button. The web page user interface should appear. The following sections will describe how to map a DIC file and a database.

To map a DIC file:

To the left of the screen there should be a list of choices entitled "Database Tools." Click on the Dictionary Parsing Tool. On the screen to the right, click on the "Parse A New Dictionary" button. You will be prompted to fill in the network location, name, short description, and your company name. Enter the full network path and dictionary file name. The dictionary file name will be "EBF.DIC." For the second box, the name box, enter in the name "DOTtest."

The short description and company name boxes are not required information and can be left blank. Click the "Continue" button.

A screen informing you that the dictionary was parsed successfully should appear. The screen will list the contents of the dictionary file. You can check that the contents are correct by opening up the actual dictionary file using a file editor such as Notepad or Wordpad. This completes the process for mapping a dictionary file.

To map a database and create an extraction plan for a parameter:

To the left of the screen, there should be a list of choices entitled "Database Tools." Click on the Database Owners Tool. On the screen to the right, use the list box to select "<new>" and then click on the "Continue" button. You will then be prompted to enter in the database information. In the first box, select "Microsoft Access 2000 (.mdb file)." In the next box, enter the full network path (such as "\\WD.....\FRAMES\DOTdb01.mdb" and the name of the database, which is "DOTdb01.mdb.")

In the next box, enter "Test01." The next four boxes can be left blank. In the last box, use the list box to select "DOTtest," which is the DIC file that you just mapped. Then click on the "Continue" button.

The "Extraction Plan - Parameter Selection" page should appear on the screen. Use the list box to select "Effect - Description of effect" and then click on the "Continue" button.

The "Extraction Plan - Table Selection" page should appear. Click on the box to the left of "Data3" to select and assume this as the table for data to be retrieved from. Then click on the "Continue" button.

The "Extraction Plan - Field Selection" page should appear. Click on the box to the left of "T3FieldOne" to select and assume this as the field data to be retrieved from. Then click on the "Continue" button.

The "Extraction Plan - Match Parameter with Database Field" page should appear. "Effect" should appear in the list box. This indicates that the field "T3FieldOne" in the table "Data3" will be mapped to the "Effect" parameter in the DIC file. Then click on the "Continue" button.

The "Extraction Plan - Filter Selection" page should appear. Use the list box provided to select "Data3.T3FieldOne" for the Field and use the other list box to select ">=" for the Operator. Then click on the "Continue" button.

The "Extraction Plan - SQL string Results" page should appear. Paragraph is too hard to read; break it up, then delete this comment.

You will need to fill in a key value for the Effect. Type "22" in the text box. Then click on the "Test Extraction Plan" button to test the extraction plan entered.

The results of the query run should appear. The entries for the "T3FieldOne" in Table "Data3" will be mapped to the "Effect" parameter. A table (NOTE: You should show this here as in Table 5.11. Then delete this comment.) should appear with "Effect" as the label and the numbers, 22, 33, and 44 listed below it.

Click on the button "Save Extraction Plan" to save the extraction plan. A message indicating that the "Save" was successful should appear. This completes the process for mapping a database and creating an extraction plan. The browser can now be exited to end the test case.

5.1.2.1.5 Results

1) The DOT connected to the Access 2000 database.
2) The DOT was accessible on a server via the Internet.
3) The DOT asked for user login credentials for security.
4) The DOT provided a web-page interface for creating stored execution plans.
5) The DOT provided a web-page interface for creating and storing ODBC-connection information for the source database.
6) The DOT provided a web-page interface for creating and storing DIC-connection information for FRAMES datasets.

7) The DOT provided the capability to test and modify extraction plans.

8) The DOT was used by the database owner and assisted in mapping the data from the source database into FRAMES dataset(s) outlined by the DIC file.

9) The DOT stored the database scheme (structure), DIC scheme, and extraction plans.

10) The DOT was capable of joining data from separate tables within a database when searching for requested data.

11) The DOT was capable of filtering out non-unique data when the option is selected through the DOT user interface.

12) The DOT allowed the user to enter data necessary to specify the name and location of a database.

13) The DOT allowed the user to choose the FRAMES dataset DIC to map to.

14) The DOT read a DIC file to determine parameter list.

15) The DOT read a DIC file to determine parameter correlations.

16) The DOT allowed the user to specify how parameters are mapped.

17)   The DOT created an extraction plan(s) in the form of an SQL statement with replacable parameters (keys).

18) The DOT created an extraction plan(s) capable of retrieving a list

19) The DOT shall create an extraction plan(s) capable of retrieving related data from multiple tables.

20) The DOT shall create stored extraction plan that may have one or more key values associated with it.

21) The DOT shall provide error messages when DIC or MDB files are not found.

22 The DOT operated within FRAMES under Windows-95 or higher.

5.1.2.2 DOT_02

5.1.2.2.1 Description and Rationale

This test case addresses the capability of the DOT to create and store an extraction plan that may have **one or more key values associated** with it. The DIC mapping used in test case DOT_01 will be used, but a separate extraction plan will be created for a parameter that has three key values.

5.1.2.2.2 Input Data

This test case requires that you use the dictionary file "EBF.DIC" and the database "DOTDB01.MDB." Both of these files should be located on a computer that can be mapped and accessed through the Internet. All other input will be described in the procedure section below.

5.1.2.2.3 Expected Results

It is expected that the DOT will correctly store and execute an extraction plan for a parameter that has three key values associated with it.

The results should be presented in the format shown in Table 5.3:

Table 5.3. Expected Results DOT_02

LCChemDur	LCChemCon	LCChem
103	data33	203
104	data44	204

5.1.2.2.4 Procedure

Place the DOT server on a computer that can be accessed by the computer that will be used to carry out this test plan. Then bring up a browser (i.e., Netscape, Internet Explorer, etc.) and type in the URL to map the computer and folder location. If the DOT server is located on a computer that is behind a firewall, which is recommended, you will be prompted to enter a user ID and password. Enter those and click on the "Ok" button. The web page user interface should appear.

To create an extraction plan for the parameter:

To the left of the screen, there should be a list of choices entitled "Database Tools." Click on the "Database Owners Tool." On the screen to the right, use the list box to select **the database that was mapped** for test case DOT_01 and then click on the "Continue" button.

The "Extraction Plan - Parameter Selection" page should appear on the screen. Use the list box to select "LCChem, LCChemDur, LCChemCom - LC effect concentration values, LC effect duration, Comment on conditions of measurement for LC values" and then click on the "Continue" button.

The "Extraction Plan - Table Selection" page should appear. Click on the box to the left of "Data2" to select this as the table for data to be retrieved from.   Then click on the "Continue" button.

The "Extraction Plan - Field Selection" page should appear. Click on the boxes to the left of "T2Field1," "T2Field2," and "T2Field3" to select these as the field data to be retrieved from.   Then click on the "Continue" button.

The "Extraction Plan - Match Parameter with Database Field" page should appear; for Data2.T2Field1, select "LCChemCom"; for Data2.T2Field2, select "LCChemDur"; and for Data2.T2Field3, select "LCChem." This indicates the three keys to use to map the DIC parameters to the database parameters. Then click on the "Continue" button.

The "Extraction Plan - Select Units of Database Fields" page should appear; for Data2.T2Field3 select "mg/kg"; and for Data2.T2Field2, select "day". This indicates the units of measure for the identified fields in the database. Then click on the "Continue" button.

The "Extraction Plan - Filter Selection" page should appear. For the key value "LifeFormSci," select the field "Data2.ID" and the operator ">"; for the key value "ChemID," select the field "Data2.T2Field4" and

the operator "="; for the key value "LCDescript," select the field "Data2.T2Field5" and the operator "<=." Then click on the "Continue" button

The "Extraction Plan - Results" page should appear. Enter the following three key values in the three boxes: 1, 303, T2F5G. Click on the "Test Extraction Plan" button to test the extraction plan entered.

The results of the query run should appear. A table should appear that looks similar to the one listed in Section 5.1.2.2.3., producing the same data values associated with the same field headings, although the sequence of columns from left to right might vary.

Click on the button "Save Extraction Plan" to save the extraction plan. A message indicating that the save was successful should appear. This completes the process for mapping a database and creating an extraction plan. The browser can now be exited to end the test case.

5.1.2.2.5 Results

The DOT allowed the user to enter in a parameter mapping with three key values, ran a test to ensure that the extraction plan worked properly, and saved the extraction plan.

5.1.2.3 DOT_03

5.1.2.3.1 Description and Rationale

This test case addresses the capability of the DOT to create and store an extraction plan that may have one or more key values associated with it. The DIC mapping used in test case DOT_01 will be used, but a separate extraction plan will be created for a **parameter that has five key values**. (Important, make bold then delete this comment.) This test case also addresses the capability of the DOT to create and store an extraction plan that includes parameters from separate tables. The DOT should be capable of joining fields from separate tables to return the data requested by the extraction plan.

5.1.2.3.2 Input Data

This test case requires that you use the dictionary file "EBF.DIC" and the database "DOTDB01.MDB." Both of these files should be located on a computer that can be mapped and accessed through the Internet. All other input will be described in the procedure section below.

5.1.2.3.3 Expected Results

It is expected that the DOT will correctly store and execute an extraction plan that includes parameters from two separated tables and join them to return the data requested by the extraction plan. It is also expected that the DOT will correctly store and execute an extraction plan for a parameter that has five key values associated with it.

The results should be presented in the format shown in Table 5.4:

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Table 5.4. Expected Results DOT_03

ECChem	ECChemCom	ECChemDur*
data55	data5	0.000638

5.1.2.3.4 Procedure

Place the DOT server on a computer that can be accessed by the computer that will be used to carry out this test plan. Then bring up a browser (i.e., Netscape, Internet Explorer, etc.) and type in the URL to map the computer and folder location. If the DOT server is located on a computer that is behind a firewall, which is recommended, you will be prompted to enter a user ID and password. Enter those and click on the "Ok" button. The web page user interface should appear.

To create an extraction plan for the parameter:

To the left of the screen, there should be a list of choices entitled "Database Tools." Click on the "Database Owners Tool." On the screen to the right, use the list box to select the database that was mapped for test case DOT_01, and then click on the "Continue" button.

The "Extraction Plan - Parameter Selection" page should appear on the screen. Use the list box to select "ECChem, ECChemDur, ECChemCom - EC effect concentration values, EC effect duration, Comment on conditions of measurement for EC values" and then click on the "Continue" button.

The "Extraction Plan - Table Selection" page should appear. Click on the boxes to the left of "Data2" and "data1" to select them as the tables for data to be retrieved from. Then click on the "Continue" button.

The "Extraction Plan - Field Selection" page should appear. Click on the boxes to the left of "T2Field1," "D1Field1," and "D1Field3" to select these as the field data to be retrieved from. Then click on the "Continue" button.

The "Extraction Plan - Match Parameter with Database Field" page should appear; for Data2.T2Field1, select "ECChem"; for Data1.D1Field1, select "ECChemCom"; and for Data1.D1Field3, select "ECChemDur." This indicates the three keys to use to map the DIC parameters to the database parameters. Then click on the "Continue" button.

The "Extraction Plan - Select Units of Database Fields" page should appear; for Data2.T2Field1, select "mg/kg"; and for Data1.D1Field3, select "sec". This indicates the units of measure for the identified fields in the database. Then click on the "Continue" button.

The "Extraction Plan - Join Selection" page should appear. Under the box labeled "Left," use the list box to select "data1.ID." Under the box labeled "Operator," use the list box to select "=." Under the box labeled "Right," use the list box to select "Data2.ID." Then click on the "Add Join" button. The text "data1.ID = Data2.ID" should appear in the lower window. Then click on the "Continue" button.

The "Extraction Plan - Filter Selection" page should appear. Use the list boxes to enter in the data shown in Table 5.5. Then click on the "Continue" button.

Table 5.5. Filter Selection Data For DOT_03

Key Value	Field	Operator
Effect	data1.ID	>
LifeFormSci	Data2.T2Field3	=
ChemID	data1.D1Field1	=
ECDescript	data1.D1Field4	=
Bodypart	data1.D1Field5	=

The "Extraction Plan - Results" page should appear. Enter the following three key values in the five boxes:.

data5 for data1.D1Field1,
205 for Data2.T2Field3,
555 for data1.D1Field4,
5555 for data1.D1Field5, and
4 for data1.ID

Click on the "Test Extraction Plan" button to test the extraction plan entered. The results of the query run should appear. A table should appear that looks similar to the one listed in Section 5.1.2.3.3. Click on the button "Save Extraction Plan" to save the extraction plan. A message indicating that the save was successful should appear. This completes the process for mapping a database and creating an extraction plan. The browser can now be exited to end the test case.

5.1.2.3.5 Results

The DOT correctly stored and executed an extraction plan that included parameters from two separated tables and joined them to return the data requested by the extraction plan. The DOT also allowed the user to enter in a parameter mapping with five key values, ran a test to ensure that the extraction plan worked properly, and saved the extraction plan.

5.1.2.4 DOT_04

5.1.2.4.1 Description and Rationale

This test case addresses the capability of the DOT to return only unique data when the "unique" data selection is made. An extraction plan will be run in which duplicate values are returned. The case will then

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be run a second time The DIC mapping used in test case DOT_01 will be used, but a separate extraction plan will be created for a parameter that has six key values.

5.1.2.4.2 Input Data

This test case requires that you use the dictionary file "EBF.DIC" and the database "DOTDB01.MDB." Both of these files should be located on a computer that can be mapped and accessed through the Internet. All other input will be described in the procedure section below.

5.1.2.4.3 Expected Results

It is expected that the DOT will correctly return only unique data when the "unique" data selection is made. The results of the extraction plan run without the "unique" selection made should be as shown in Table 5.6:

Table 5.6. Expected Results for Query Without "Unique" Selection

ChemName	ChemID
data1	11
data2	22
data3	33
data4	44
data5	55
data1	11
data8	88
data8	88
data9	99

The results of the extraction plan run with the "unique" selection made should be as shown in Table 5.7. Note that the duplicate rows for data1 and data8 do not appear.

Table 5.7. Expected Results For Query With 'unique' Selection

ChemName	ChemID
data1	11

ChemName	ChemID
data2	22
data3	33
data4	44
data5	55
data8	88
data9	99

5.1.2.4.4 Procedure

Place the DOT server on a computer that can be accessed by the computer that will be used to carry out this test plan. Then bring up a browser (i.e., Netscape, Internet Explorer, etc.) and type in the URL to map the computer and folder location. If the DOT server is located on a computer that is behind a firewall, which is recommended, you will be prompted to enter a user ID and password. Enter those and click on the "Ok" button. The web page user interface should appear.

To create an extraction plan for the parameter:

To the left of the screen there should be a list of choices entitled "Database Tools." Click on the Database Owners Tool. On the screen to the right, use the list box to select the database that was mapped for test case DOT_01 and then click on the "Continue" button.

The "Extraction Plan - Parameter Selection" page should appear on the screen. Use the list box to select "ChemID, ChemName - Chemical CAS ID, Chemical common name" and then click on the "Continue" button.

The "Extraction Plan - Table Selection" page should appear. Click on the box to the left of "data1" to select it as the table for data to be retrieved from.   Then click on the "Continue" button.

The "Extraction Plan - Field Selection" page should appear. Click on the boxes to the left of "D1Field1" and "D1Field3" to select these as the field data to be retrieved from.   Then click on the "Continue" button.

The "Extraction Plan - Match Parameter with Database Field" page should appear; for data1.D1Field1, select "ChemName" and for data1.D1Field3, select "ChemID." This indicates the two database parameters that will be mapped to the DIC parameters. Then click on the "Continue" button.

The "Extraction Plan - Filter Selection" page should appear.   No input is needed on this page. Click on the "Continue" button.

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The "Extraction Plan - Results" page should appear. Click on the "Test Extraction Plan" button to test the extraction plan entered. The results of the query run should appear. The results of the query run should appear. A table should appear that looks similar to the one listed in Section 5.1.2.4.3 for the extraction plan without the "unique" selection.

You will now re-do the extraction plan with the "unique" selection. Click on the "Back" button on your browser to move to the previous page, which should be "Extraction Plan - Results." Click on the "Back" button on your browser again to move to the previous page, which should be "Extraction Plan - Filter Selection." In the middle of this page, there is text that states "Click here if you would like the results to be distinct." Click in the box to the right of this text. A check should appear in the box. Click on the "Continue" button to get to the next page. Then click on the "Test Extraction Plan" button again to test the extraction plan entered. The results of the query run should appear. A table should appear that looks similar to the one listed in Section 5.1.142.4.3 for the extraction plan with the "unique" selection.

Click on the button "Save Extraction Plan" to save the extraction plan. A message indicating that the save was successful should appear. This completes the process for mapping a database and creating an extraction plan. The browser can now be exited to end the test case.

5.1.2.4.5 Results

The DOT returned only unique values for an extraction plan when the "unique" selection was made.

5.1.2.5 DOT_05

5.1.2.5.1 Description and Rationale

This test case addresses the capability of the DOT to provide error messages to the user when the DIC file specified, or the database file specified, cannot be located. This may be caused by typing in the file names or file path incorrectly. In this case, the file path to the DIC file and database file will be entered incorrectly. The DOT should provide appropriate error messages. It should be noted that the DOT does not check that the file it finds is formatted according to the FRAMES specifications. If it finds a file that is mapped, it will try to parse it and display the contents to the screen. If the file is not in the correct format, the data written to the screen will be incorrect, and it should be apparent to the database owner.

5.1.2.5.2 Input Data

All input will be described in the procedure section below.

5.1.2.5.3 Expected Results

It is expected that the DOT will provide appropriate error messages when the DIC file or database file cannot be found.

5.1.2.5.4 Procedure

Place the DOT server on a computer that can be accessed by the computer that will be used to carry out this test plan. Then bring up a browser (i.e., Netscape, Internet Explorer, etc.) and type in the URL to map the computer and folder location. If the DOT server is located on a computer that is behind a firewall, which is recommended, you will be prompted to enter a user ID and password. Enter those and click on the "Ok" button. The web page user interface should appear. The following sections will describe how to test for the error messages.

DIC error message:

To the left of the screen there should be a list of choices entitled "Database Tools." Click on the "Dictionary Parsing Tool." On the screen, click on the "Parse A New Dictionary" button. You will be prompted to fill in the network location, name, short description, and your company name. Enter the full network path and dictionary file name. The dictionary file name will be "EBF2.DIC." For the second box, the name box, enter in the name DOTtest. The short description and company name boxes are not required information and can be left blank. Click the "Continue" button. A screen should appear with the text "The dictionary file was not found!" and an option should be provided to re-enter the dictionary information. This completes the process for checking for the DIC error message.

Database error message:

To the left of the screen there should be a list of choices entitled "Database Tools." Click on the "Database Owners Tool." On the screen to the right, use the list box to select "<new>" and then click on the "Continue" button. You will then be prompted to enter in the database information. In the first box, select "Microsoft Access 2000 (.mdb file)." In the next box, enter the full network path and the name of the database, which is "temp.mdb." In the next box, enter "Temp." The next four boxes can be left blank. In the last box, use the list box to select "DOTtest," which is the DIC file that you just mapped. Then click on the "Continue" button. A screen should appear with text indicating that the database file could not be found, and an option should be provided to re-enter the dictionary information. This completes the process for checking for the database error message.

5.1.2.5.5 Results

The DOT provided appropriate error messages when it could not locate a DIC file or a database file.

5.1.2.6 DOT_06

5.1.2.6.1 Description and Rationale

This test case addresses the capability of the DOT to correctly use filters in an extraction plan. The DIC mapping used in test case DOT_01 will be used, but a separate extraction plan will be created for a parameter that has six key values.

5.1.2.6.2 Input Data

This test case requires that you use the dictionary file "EBF.DIC" and the database "DOTDB01.MDB." Both of these files should be located on a computer that can be mapped and accessed through the Internet. All other input will be described in the procedure section below.

5.1.2.6.3 Expected Results

It is expected that the DOT will correctly use filters in an extraction plan (see Table 5.8).

Table 5.8. Expected Results For Query With a Filter

Bodypart
103
104
105
106

5.1.2.6.4 Procedure

Place the DOT server on a computer that can be accessed by the computer that will be used to carry out this test plan. Then bring up a browser (i.e., Netscape, Internet Explorer, etc.) and type in the URL to map the computer and folder location. If the DOT server is located on a computer that is behind a firewall, which is recommended, you will be prompted to enter a user ID and password. Enter those and click on the "Ok" button. The web page user interface should appear.

To create an extraction plan for the parameter:

To the left of the screen, there should be a list of choices entitled "Database Tools." Click on the "Database Owners Tool." On the screen to the right, use the list box to select the database that was mapped for test case DOT_01 and then click on the "Continue" button.

The "Extraction Plan - Parameter Selection" page should appear on the screen. Use the list box to select "Bodypart - Body part description" and then click on the "Continue" button.

The "Extraction Plan - Table Selection" page should appear. Click on the box to the left of "data2" to select it as the table for data to be retrieved from. Then click on the "Continue" button.

The "Extraction Plan - Field Selection" page should appear. Click on the box to the left of "T2Field2" to select it as the field data to be retrieved from. Then click on the "Continue" button.

5.16

The "Extraction Plan - Match Parameter with Database Field" page should appear. For data2.T2Field2, select "Bodypart." This indicates the database parameter that will be mapped to the DIC parameter. Then click on the "Continue" button.

The "Extraction Plan - Filter Selection" page should appear. Enter the text (but without quote marks) "data2.t2field2 > 102" in the window provided. Then click on the "Continue" button.

The "Extraction Plan - Results" page should appear. Click on the "Test Extraction Plan" button to test the extraction plan entered. The results of the query run should appear. The results of the query run should appear. A table should appear that looks similar to the one listed in Section 5.1.2.6.3 for the extraction plan without the "unique" selection.

Click on the button "Save Extraction Plan" to save the extraction plan. A message indicating that the save was successful should appear. This completes the process for mapping a database and creating an extraction plan. The browser can now be exited to end the test case.

5.1.2.6.5 Results

The DOT allowed the user to enter in a parameter mapping with six key values, ran a test to ensure that the extraction plan worked properly, and saved the extraction plan.

5.2 Data Extraction Tool (DET)

The DET is the tool that actually implements the database extraction plan that is generated by the DOT. It is responsible for sending the data query from FRAMES to the database, extracting the pertinent data, and returning it to FRAMES for use by the requesting model. (Note: The DOT testing must be completed before continuing to the DET testing. The DET testing requires the extraction plans created during the DOT testing.)

5.2.1 Summary of Requirements

Requirements for the DET are described in Section 2.0. of this document. These requirements were reworded, as necessary, to create a list of fundamental requirements that are suitable for testing. Table 5.1 lists these requirements. To ensure that the DET meets the requirements listed in Table 5.9, test cases were developed to check performance. Table 5.10 shows the relationship between these requirements and the test cases described in Section 5.2.2.

Table 5.9. Fundamental Requirements for Testing the DET

Requirement Number	Requirement
1	The DET shall connect to any MS ACCESS 97 or ACCESS 2000 database.
2	The DET shall execute an extraction plan to retrieve data from the associated database.
3	The DET shall format extracted data so that it is usable by FRAMES.
4	The DET shall use key values that will be provided in requests for data and will act as filters for the extracted data. Keys are substituted in for the replaceable parameters by the DET when an extraction is executed.
5	The DET must operate within FRAMES under Windows-95 or higher.
6	The DET shall be able to perform unit conversions on fields identified in the extraction plan.

Table 5.10. Relationship Between Test Cases and DET Fundamental Requirements

		Test Case Name (DET_xx)		
		01	**02**	**03**
Requirements	1	X		
	2	X		X
	3	X		
	4		X	
	5	X		
	6		X	X

5.2.2 TEST CASES

5.2.2.1 DET_01

5.2.2.1.1 Description and Rationale

This test case addresses the capability of the DET to execute an extraction plan for a requested parameter with no, and one, key value. This test case also addresses the basic functionality of the DET; therefore, several of the other requirements are addressed in this case. The requirements addressed are listed below. These requirement numbers are referenced in the results section (Note: the requirement numbers used below do not correspond to the requirement numbers listed in Table 5.9).

1) The DET shall connect to any MS Access 97 or Access 2000 database.
2) The DET shall execute an extraction plan to retrieve data from the associated database.
3) The DET shall format extracted data so that it is usable by FRAMES.
4) The DET must operate within FRAMES under Windows-95 or higher.

5.2.2.1.2 Input Data

This test case requires that you use the dictionary file "EBF.DIC," the database "DOTDB01.MDB," and the extraction plan created during the DOT testing test case DOT_01. As in the DOT testing, both of the files should be located on a computer that can be mapped and accessed through the Internet. All other input will be described in the procedure section below.

5.2.2.1.3 Expected Results

It is expected that the DET will execute without error and will meet all of the requirements listed in Section 5.2.2.1.1.

The results (contents, but not format) returned should be similar to that shown in Table 5.11.

Table 5.11. Expected Results For Query with One Key Value

Effect
22
33
44

5.2.2.1.4 Procedure

Bring up a browser (i.e., Netscape, Internet Explorer, etc.) and type in the URL below:

with one key value:

http://wd23657/frames/extractdata.asp?step=extract&DD=edf.dic&DB=??&parameter='Effect'&keycount=1&key1=Bodypart&value1=22

alternatively, with no key values:

http://wd23657/frames/extractdata.asp?step=extract&DD=edf.dic&DB=??&parameter='Effect'&keycount=0

Note that in the middle of the URL, there is the text "DB=??." Replace the "??" with the actual database number. You can find this number by bringing up the DOT and reviewing the extraction plan

created for test case DOT_01. The database number is listed on most of the pages after the text "Database ID Selected."

This URL includes the path map and the specifics for the parameter that is being requested. The parameter being requested is " ," which was mapped in the test case DOT_01.

5.2.2.1.5 Results

1) The DET connected to an MS Access 2000 database.

2) The DET executed an extraction plan to retrieve data for a parameter with no, and one, key value(s) from the associated database.

3) The DET formatted extracted data so that it is usable by FRAMES.

4) The DET operated within FRAMES under Windows-95 or higher. The results should be as listed below.

With one key value:

3 Effect "22" "33" "44"

With no key value:

4 Effect,Bodypart "11","11" "22","22" "33","33" "44","44"

5.2.2.2 DET_02

5.2.2.2.1 Description and Rationale

This test case addresses the capability of the DET to execute an extraction plan for a requested parameter with five key values. The DIC mapping used in test case DOT_03 will be used.

5.2.2.2.2 Input Data

This test case requires that you use the dictionary file "EBF.DIC," the database "DOTDB01.MDB," and the extraction plan created during the DOT testing test case DOT_03. As in the DOT testing, both of the files should be located on a computer that can be mapped and accessed through the Internet. All other input will be described in the procedure section below.

5.2.2.2.3 Expected Results

It is expected that the DET will execute without error and will return the results listed in Table 5.12.

Table 5.12. Expected Results For Query With Five Key Values

ECChemCo m	ECChemDu r	ECChe m

5.20

data5	0.000638	data55

5.2.2.2.4 Procedure

Bring up a browser (i.e., Netscape, Internet Explorer, etc.) and type in the URL below:

http://wd23657/frames/extractdata.asp?step=extract&DD=edf.dic&DB=??&parameter='ECChem'&key count=5&key1=Effect&key2=LifeFormSci&key3=ChemID&key4=ECDescript&key5=Bodypart&value1 =4&value2=205&value3=data5&value4=555&value5=5555

Note that in the middle of the URL, there is the text "DB=??." Replace the "??" with the actual database number. You can find this number by bringing up the DOT and reviewing the database list for your database which was created for test case DOT_03. The database number is listed on most of the pages after the text "Database ID Selected."

This URL includes the path map and the specifics for the parameter that is being requested. The parameter being requested is " ," which was mapped in the test case DOT_03.

5.2.2.2.5 Results

The DET allowed the user to enter in a parameter mapping with five key values, ran the extraction plan, and displayed the results to the screen. The results should be as listed below.

1
ECChemCom,ECChemDur,ECChem
"data5","0.000638","data55"

5.2.2.3 DET_03

5.2.2.3.1 Description and Rationale

This test case addresses the capability of the DET to execute an extraction plan for a requested parameter with five key values. The DIC mapping used in test case DOT_03 will be used, but a separate request will be created for a parameter using only three of the possible five key values. The two key parameters that are not specified should be returned with the results.

5.2.2.3.2 Input Data

This test case requires that you use the dictionary file "EBF.DIC," the database "DOTDB01.MDB," and the extraction plan created during the DOT testing test case DOT_03. As in the DOT testing, both of the files should be located on a computer that can be mapped and accessed through the Internet. All other input will be described in the procedure section below.

5.2.2.3.3 Expected Results

It is expected that the DET will execute without error and will return the results listed in Table 5.13.

Table 5.13. Expected Results for Five Key Query With Only Three Keys Specified

ECChemCom	ECChemDur	ECChem	ECDescript	Bodypart
data5	0.000638	data55	555	5555

5.2.2.3.4 Procedure

Bring up a browser (i.e., Netscape, Internet Explorer, etc.) and type in the URL below:

http://wd23657/frames/extractdata.asp?step=extract&DD=edf.dic&DB=??&parameter='ECChem'&key count=3&key1=Effect&key2=LifeFormSci&key3=ChemID&value1=4&value2=205&value3=data5

Note that in the middle of the URL there is the text "DB=??." Replace the "??" with the actual database number. You can find this number by bringing up the DOT and reviewing the extraction plan created for test case DOT_03. The database number is listed on most of the pages after the text "Database ID Selected."

This URL includes the path map and the specifics for the parameter that is being requested. The parameter being requested is " ," which was mapped in the test case DOT_03.

5.2.2.3.5 Results

The DET allowed the user to enter in a parameter mapping with three of the five key values, ran the extraction plan, and displayed the results to the screen. The results should be as listed below.

1
ECChemCom,ECChemDur,ECChem,ECDescript,Bodypart
"data5","0.000638","data55","555","5555"

5.3 Database Client Editor (DCE)

The DCE allows the user to specify what data are being requested from the database. The DCE makes calls to the DET and DOT to obtain the requested data and provide it for the requesting model. (Note: The DOT testing must be completed before the DCE testing. The DCE testing requires the extraction plans created during the DOT testing.)

5.3.1 Summary of Requirements

Requirements for the DCE are described in Section 2.0. of this document. These requirements were reworded, as necessary, to create a list of fundamental requirements that are suitable for testing. Table

5.14 lists these requirements. To ensure that the DCE meets the requirements listed in Table 5.14, a test case was developed to check performance.

Table 5.14. Fundamental Requirements for Testing the DCE

Requirement Number	Requirement
1	The DCE shall operate within FRAMES under Windows-95 or higher.
2	The DCE shall issue extraction queries to DET via HTTP.
3	The DCE shall extract all data from Eco Benchmark database via DET based on chemical and species alias selections.
4	The DCE shall display extracted data in user interface.
5	The DCE shall include a DES file for use in FRAMES.
6	The DCE shall read a GID file, specifically the CON section of a GID file to determine chemicals of concern.
7	The DCE shall read the dataset dictionary file (.DIC) to determine dataset parameters to retrieve.
8	The DCE shall retrieve a list of lifeforms from the Eco Benchmark database via DET and display for user selection.
9	The DCE shall retrieve a list of chemicals from the Eco Benchmark database via DET and display for user alias selection.
10	The DCE shall allow the user to alias one lifeform to another.
11	The DCE shall allow the user to alias one chemical to another.
12	The DCE shall allow the user to edit the data retrieved.
13	The DCE shall write an ECO GID section that contains the extracted parameters names and values.
14	The DCE shall create an error file on start up.
15	The DCE shall delete the error if there are no errors.

5.3.2 TEST CASE

5.3.2.1 DCE_01

5.3.2.1.1 Description and Rationale

This test case addresses the capability of the DCE to allow the user to specify what data are being requested from the database. The DCE makes calls to the DET and DOT to obtain the requested data and provide it for the requesting model. This test case also addresses the basic functionality of the DOT; therefore, several of the other requirements are addressed in this case. The requirements addressed are listed below. These requirement numbers are referenced in the results section.

1) The DCE shall operate within FRAMES under Windows-95 or higher.
2) The DCE shall issue extraction queries to DET via HTTP.
3) The DCE shall extract all data from Eco Benchmark database via DET based on chemical and species alias selections.
4) The DCE shall display extracted data in user interface.
5) The DCE shall include a DES file for use in FRAMES.
6) The DCE shall read a GID file, specifically the CON section of a GID file, to determine chemicals of concern.
7) The DCE shall read the dataset dictionary file (.DIC) to determine dataset parameters to retrieve.
8) The DCE shall retrieve a list of lifeforms from the Eco Benchmark database via DET and display for user selection.
9) The DCE shall retrieve a list of chemicals from the Eco Benchmark database via DET and display for user alias selection.
10) The DCE shall allow the user to alias one lifeform to another.
11) The DCE shall allow the user to alias one chemical to another.
12) The DCE shall allow the user to edit the data retrieved.
13) The DCE shall write an ECO GID section that contains the extracted parameters names and values.
14) The DCE shall create an error file on start up.
15) The DCE shall delete the error if there are no errors.

5.3.2.1.2 Input Data

This test case requires that you use the dictionary file "EBF.DIC" and the database "DOTDB01.MDB." Both of these files should be located on a computer that can be mapped and accessed through the Internet. All other input will be described in the procedure section below.

5.3.2.1.3 Expected Results

It is expected that the DCE will execute without error and will meet all of the requirements listed in Section 5.3.2.1.1.

5.3.2.1.4 Procedure

Setting up the conceptual site model for the scenario:

Create a folder called "DCE_01" under the FRAMES folder. Bring up the FRAMES User Interface (FUI). Select New from the File Menu. Enter the file "DCE_01.GID" and save it to the newly created folder. Then add a Contaminant icon and an Eco Benchmarks icon to the working space window to the right. Connect the two icons. The connection should go from the Contaminant icon to the Eco Benchmarks icon. To select the contaminant model, right click on the Contaminant icon and select General Info. Click on FRAMES Default Chemical Database Selection and type in "Contaminants" in the box to the right of the word "Label" above. Then click on the "Ok" button. At this point, you have selected the FRAMES contaminant database to use in this case. You will next select your contaminant. Right click on the Contaminant icon and select "User Input." The user interface for the FRAMES Contaminant database will appear on the screen. Select the constituent "Fluoranthene," and then save and exit. The signal light on the contaminant icon should be green.

You will next select an Eco Benchmarks model and enter its associated data through its user interface, which is the DCE. Right click on the Eco Benchmarks icon and select "General Info." Click on something that appears similar to "PNL ERED Database" and type "ERED" in the box to the right of the word "Label" above. Then click on the "OK" button. At this point, you have selected the ERED database to use in this case.

You will next enter the data for the database. Right click on the Eco Benchmarks icon and select " User Input." You will be prompted to enter a user ID and password. Enter those and click on the "Ok" button. The Loading Data progress bar will appear. The DCE user interface should appear.

Entering data through the DCE

A tree-view options menu will appear on the left side of the screen. Click on "Chemical Aliases" to select the chemical mapping. In the lower window entitled "Selected Chemicals of concern for this Assessment," click on the number "206440," which is the CAS ID for fluoranthene. The number "206-44-0" should appear in the upper window. This indicates which chemical has been mapped to the chemical of concern.

You will next select the lifeform and its alias. Click on "LifeForm Selection." A list of lifeforms available in the ERED database will appear. Select "Asterias rubens." Then click on "LifeForm Aliases" on the menu to the left. In the lower window entitled "Selected Lifeforms of concern for this Assessment," click on the text "Asterias Rubens." The text "Asterias Rubens" should appear in the upper window. This indicates which lifeform has been mapped to the lifeform of concern.

You will next use the DCE to retrieve the data from the ERED database for the lifeform and chemical selected.   Click on "Viewing and Editing (ERED) Data Associated with Mapped Chemical(s) and Lifeform(s)." On the screen to the right, click on the button "Retrieve Data." Progress bars will appear to provide a status of the database querying. After the querying is complete, you can review the data retrieved.

Before exiting, check your FRAMES directory for a file with an ERR extension. This is the error file created by the DCE. If an error occurs during execution, a message will be written to this file. If no error occurs, this file will be deleted after the DCE is closed down. Use the File menu to save and exit the DCE.

5.3.2.1.5 Results

1) The DCE operated within FRAMES under Windows-95.
2) The DCE issued an extraction query to the DET via HTTP
3) The DCE extracted all data from Eco Benchmark database via DET based on chemical and species alias selections
4) The DCE displayed extracted data in the user interface
5) The DCE included a DES file for use in FRAMES
6) The DCE read a GID file, specifically the CON section of a GID file to determine chemicals of concern
7) The DCE read the dataset dictionary file (.DIC) to determine dataset parameters to retrieve
8) The DCE retrieved a list of lifeforms from the Eco Benchmark database via DET and displayed it for user selection
9) The DCE retrieved a list of chemicals from the Eco Benchmark database via DET and displayed it for user alias selection
10) The DCE allowed the user to alias one lifeform to another
11) The DCE allowed the user to alias one chemical to another
12) The DCE allow the user to edit the data retrieved
13) The DCE wrote an ECO GID section that contains the extracted parameters names and values
14) The DCE created an error file on start up
15) The DCE deleted the error file when there was no error