Part 5.

System i Access for Web: Database Access

Abstract

This session focuses on how easy it is to access DB2 for i5/OS from the Web. It will cover the System i Access for Web options available to upload PC data to the i5/OS database and to download database information to a PC user.

In this session, attendees will learn how to:

1. Use the SQL Wizard to build and save SELECT statements
2. Work with advanced output options, such as file types, HTML options, and lists.
3. Upload data to DB2 for i5/OS using the browser
4. Run static and dynamic queries
5. Extract select information about i5/OS objects and resources.
6. Import SQL statements created with DB2 Query Manager (5722-ST1) and IBM Query for System i (5722-QU1) into System i Access for Web

System i Access for Web – Database Functions

Access database tables on your iSeries server with iSeries Access for Web.

Tables

- View a list of database tables on your iSeries server.
- Perform actions on these tables without having knowledge of SQL and its syntax.
- View the contents of a table in a paged list, using the Quick view action.
- Add and update records in a table using the Insert and Update actions.
- Create your own customized SQL request for a table using the Run SQL action.
- Create your own customized copy data request for a table using the Copy data to table action.

My requests

- View a list of previously saved requests.
- Run or Edit requests from this list.
- Manage lists using the Copy, Delete, and Rename actions
- Create and manage shortcuts to requests

Run SQL

- Run SQL statements dynamically.
- View output as a paged list or in a popular file format, like Microsoft Excel or Lotus 1-2-3. (Output format depends on how you have your browser configured and whether the browser can locate a plug-in for the output type you choose.)
- Customize how data is returned by setting options specific to the output type.
- Build SELECT statements using an SQL Wizard.
- Save requests for repeated use.

Copy data to table

- Copy existing data files from your PC to a database table on your iSeries server.
- These data files can be in many popular file formats, including Microsoft Excel and Lotus 1-2-3.
- Replace the contents of a table or add data to an existing table.
- Create a new database table based on the contents of a workstation file.
- Save requests for repeated use.

Import request

- Import Client Access Data Transfer upload and download requests into iSeries Access for Web copy data and SQL requests.
- Imported requests are automatically converted to iSeries Access for Web format.
- Run and edit converted requests on your iSeries server just like other copy data and SQL requests.

Import query

- Import queries generated by Query for iSeries and DB2 UDB for iSeries Query Manager.
- Imported queries can be saved into iSeries Access for Web database requests.
- Run and edit converted queries on your iSeries server just like iSeries Access for Web SQL requests.

Extract server data

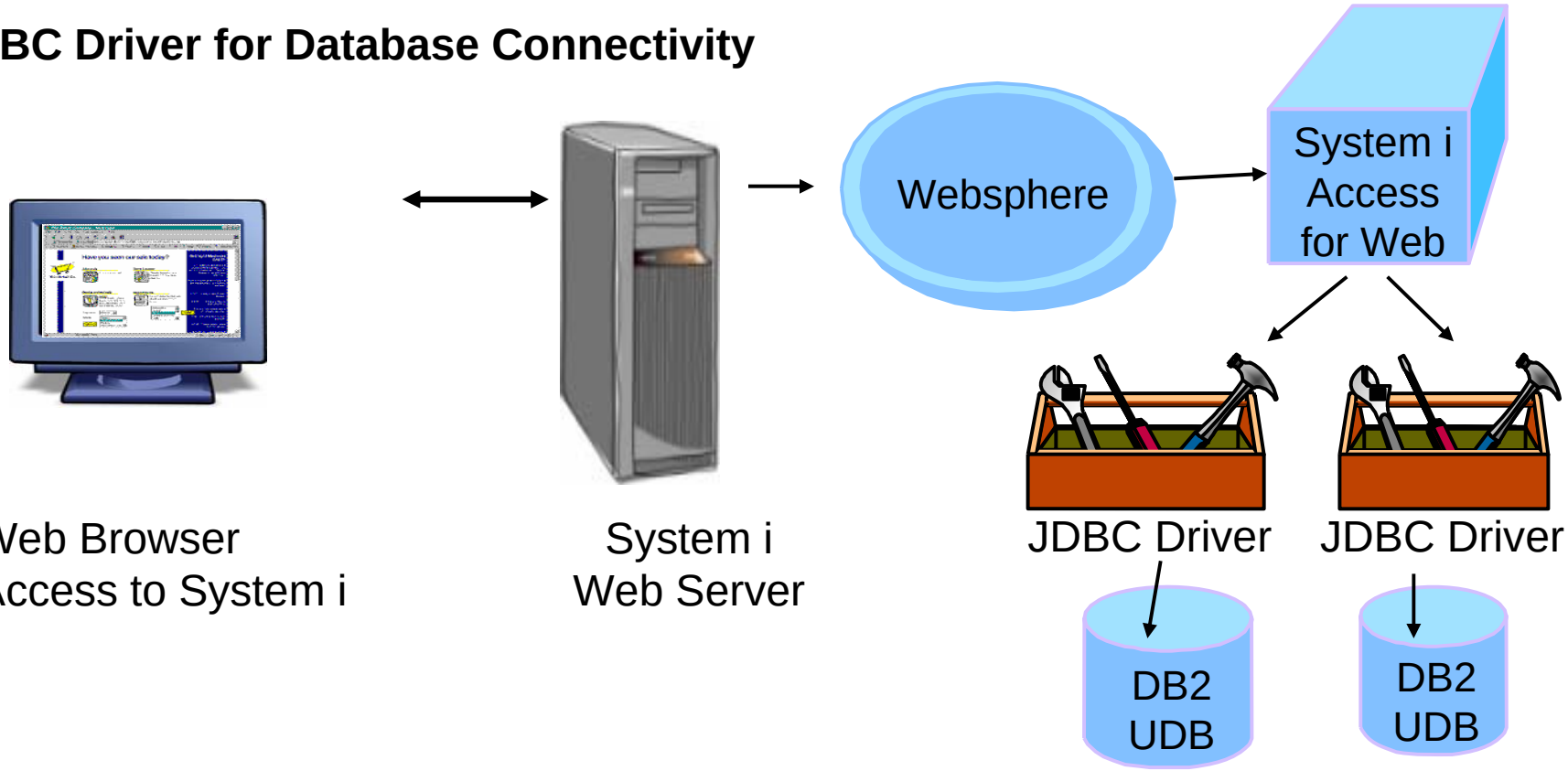
- Extract server object information into a database table.

Security and Administration

Database Overview

System i Access for Web

System I Access for Web uses the JDBC Driver for Database Connectivity



Security – Access to DB2 for i5/OS

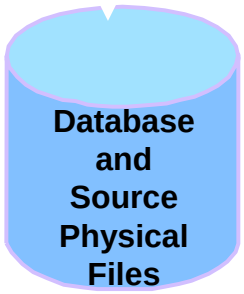
All database requests in System i Access for Web, System i Access for Windows, and System i Access for Linux flow through the System i Access Database Server

All objects on the server, including SQL objects, are managed by the system security function

- Most IBM SQL operations go through the iSeries Database DB Host Server and use the QIBM_QZDA server exit point.
- This includes Data Transfer, ODBC, .NET, parts of OLE DB, and some functions of the Toolbox (JDBC including Access for Web).
- *See: http://publib.boulder.ibm.com/iseries/v5r2/ic2924/index.htm?info/sqlp/rbafymst324.htm*

System i Access Database Server

- I5/OS Object Level Security
- Exit Programs

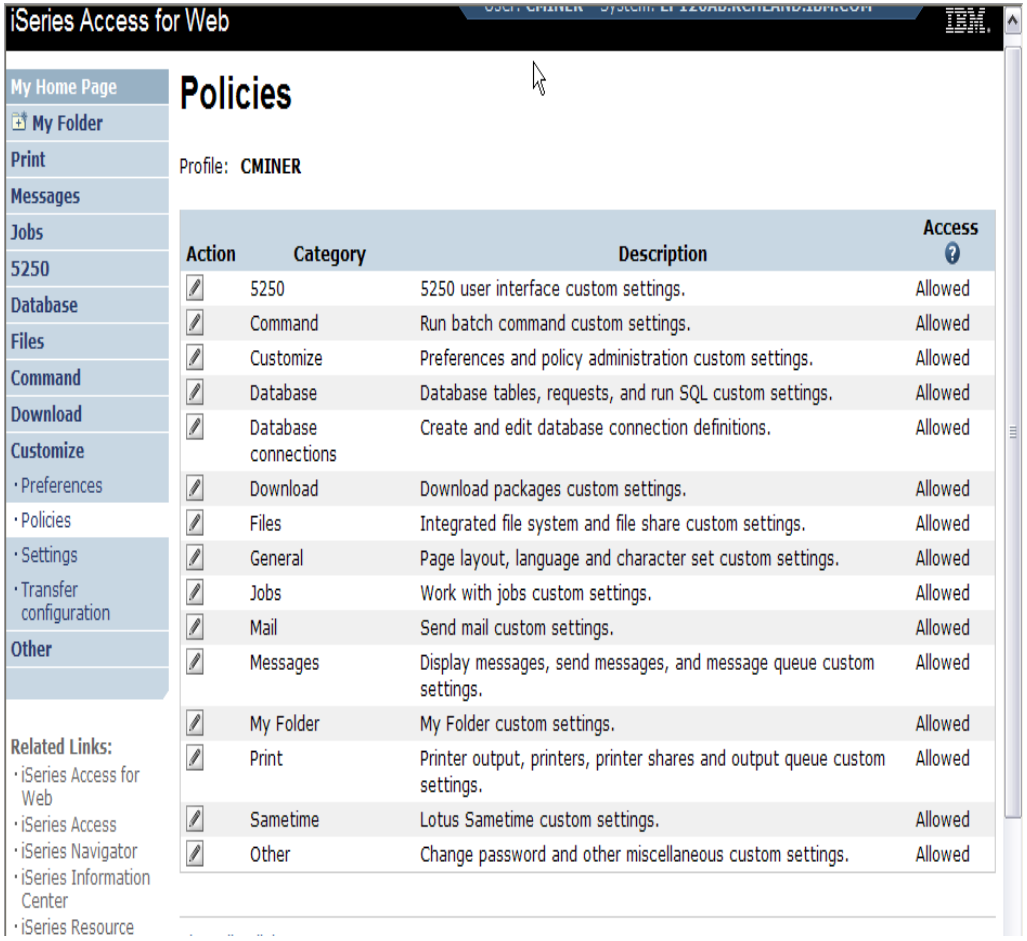


Exit Programs

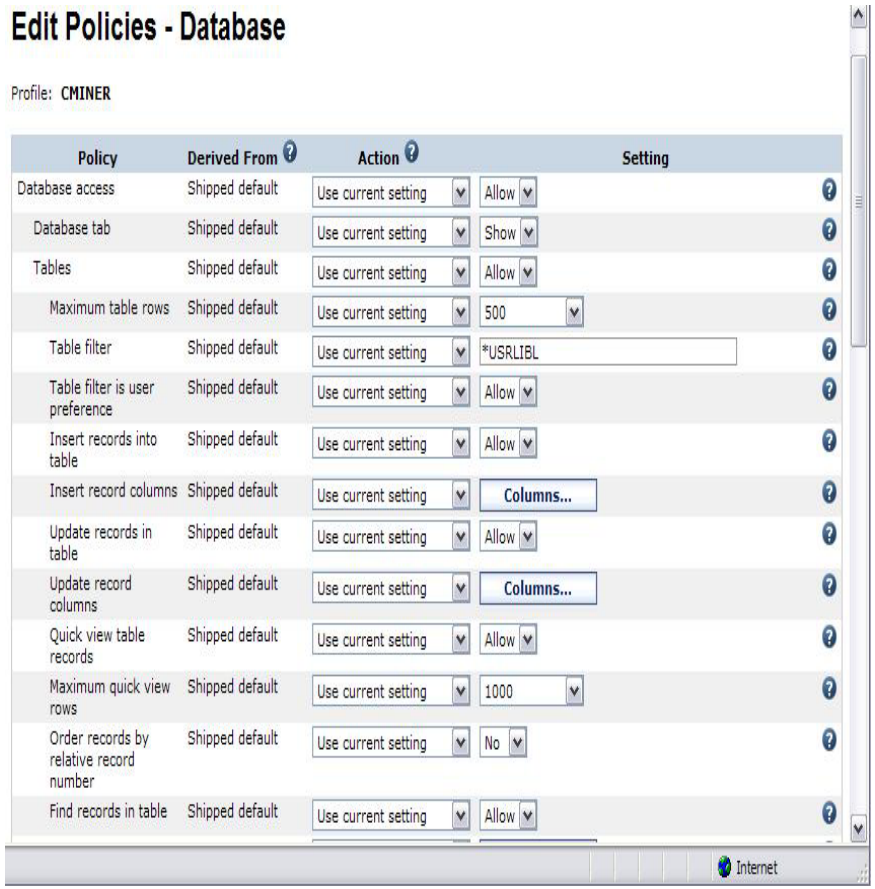
- Exit programs written for the QIBM_QZDA NDB, ROI, and SQL exit points may help to restrict certain users from accessing specific files.
- Configured with WRKREGINF on i5/OS
- Given the SQL statement sent from the client application. Statements may be rejected by the user exit program
- May be written in a variety of host languages

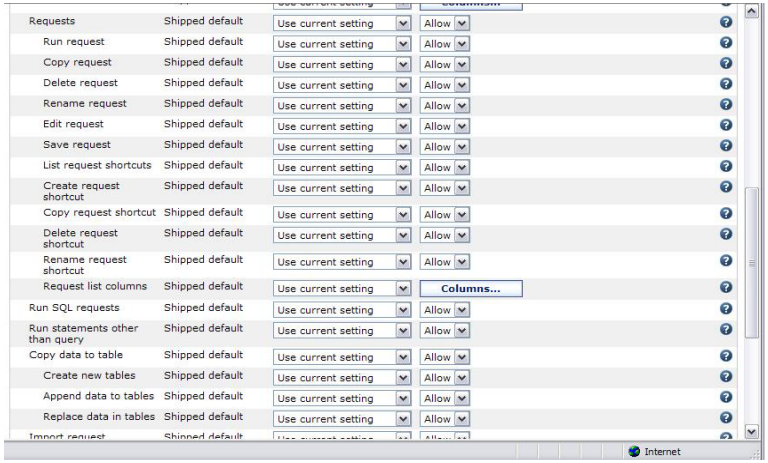
Policies

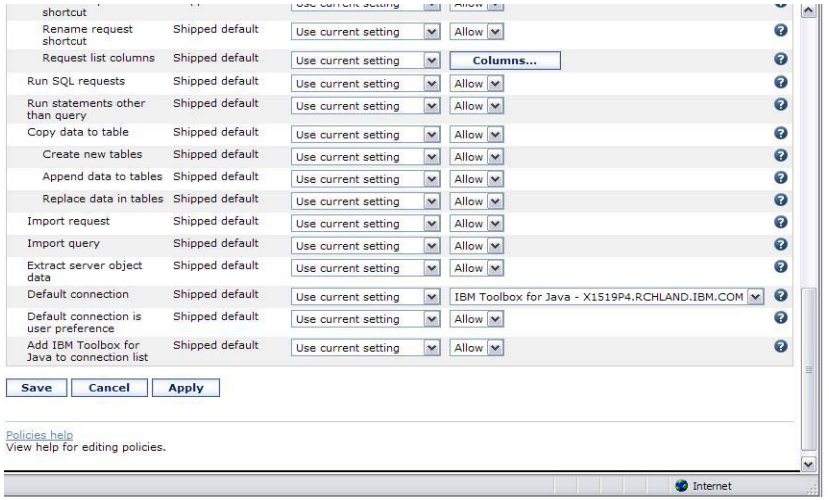
- **Control Access to Database functions by restricting access to System i Access for Web functions.**
- **Restrict by specific user, groups of users, all users**
- **Requires *SECADM authority to use**
  - **a non-SECADM user can be granted the rights to administer System i Access for Web**



All the Policies that can be set for ‘Database’ functions





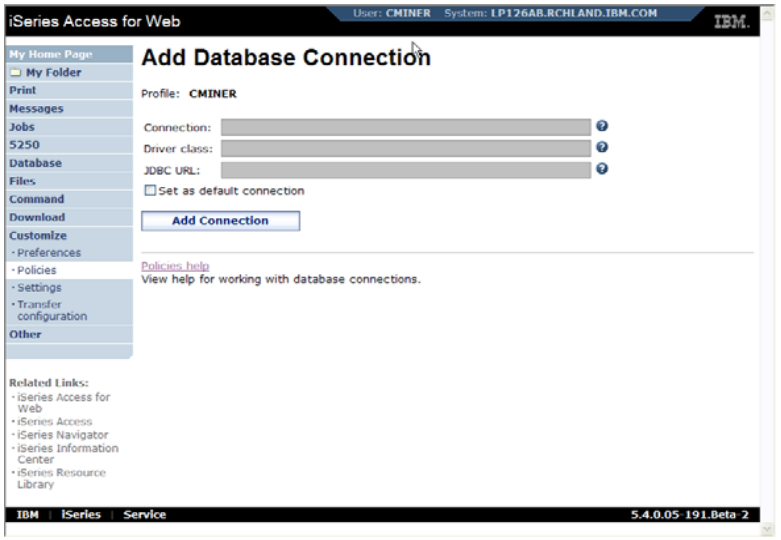


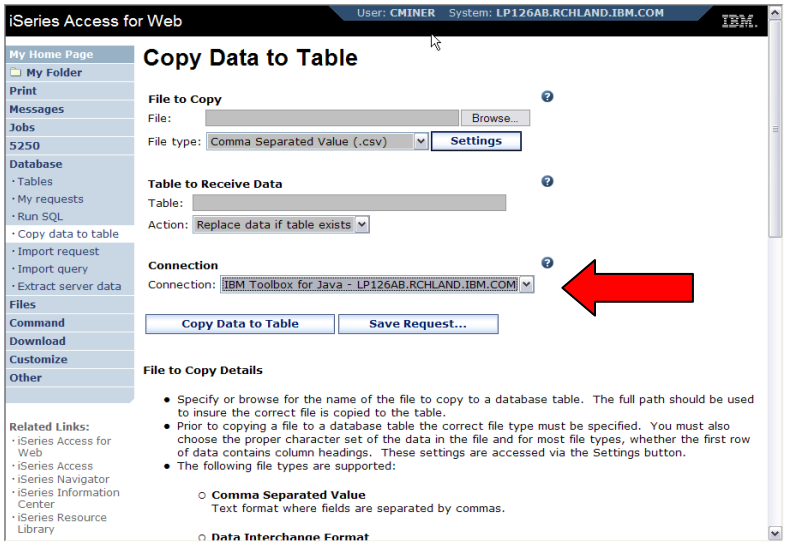
How to work with the database features

When using 'Database' functions

You can connect to multiple systems and databases with System i Access for Web

- **Simply add other database connections to your list**
  - **Easiest way to do this is to copy the default one, then modify it and save it.**
  - **It will then appear as an option in the Connection pulldown**
- **Default is IBM Toolbox for Java and is for DB2 for i5/OS, but you could use other JDBC drivers to connect to other systems**





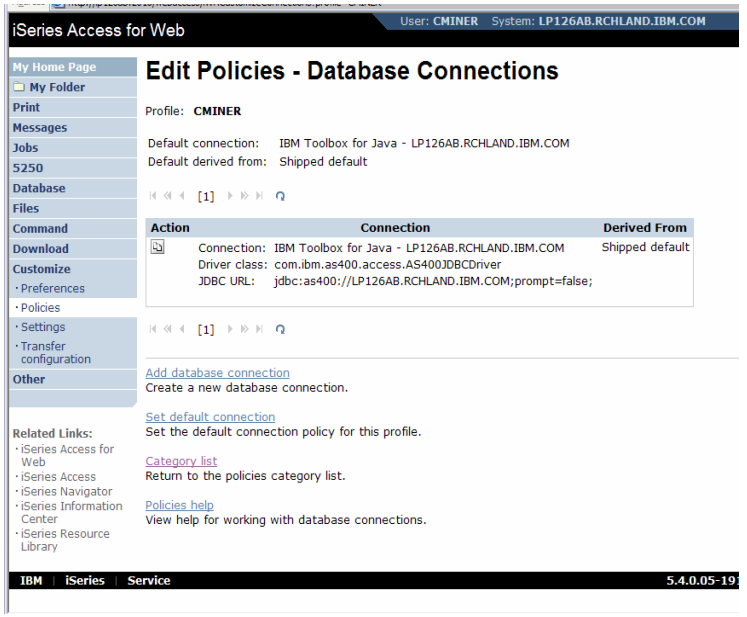
Database – use WAS data sources (new in V5R4)

Servlet version

WAS data sources are pooled and managed by WAS and should scale better than our original database connections

Two types of connection definitions are supported:

- **Driver manager connections require a driver class and a JDBC URL**
  - **Specify the JDBC driver class name to use for this database connection, ie, the IBM Toolbox for Java JDBC Driver**
- **Data source connections require a data source name.**
  - **Specify the JNDI name of the data source to use for this connection. Must have a component-managed authentication alias set if it is used in a single sign-on environment.**



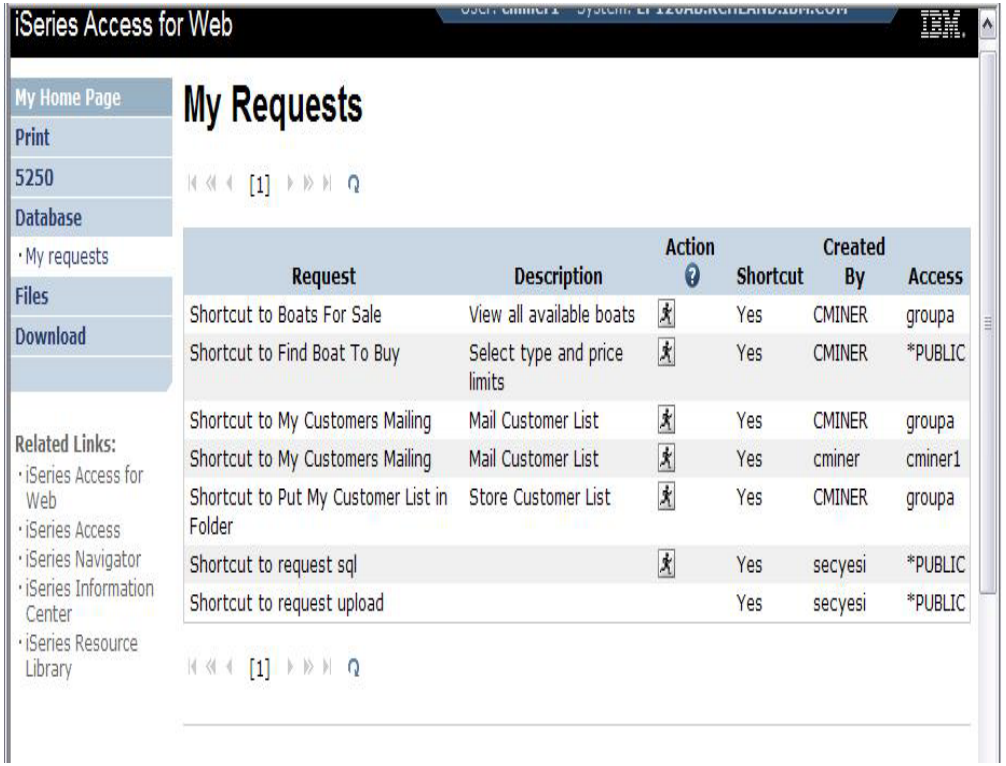
Data Source connections enable many different applications running under WebSphere to use the same data source connection

For the ‘typical’ end user

My Requests

Administrator creates queries or upload requests for end users to run.

- **Selected Users are then given access to run these selected data requests**
- **They're only given access to run those necessary to perform their job**



These are called Shortcuts

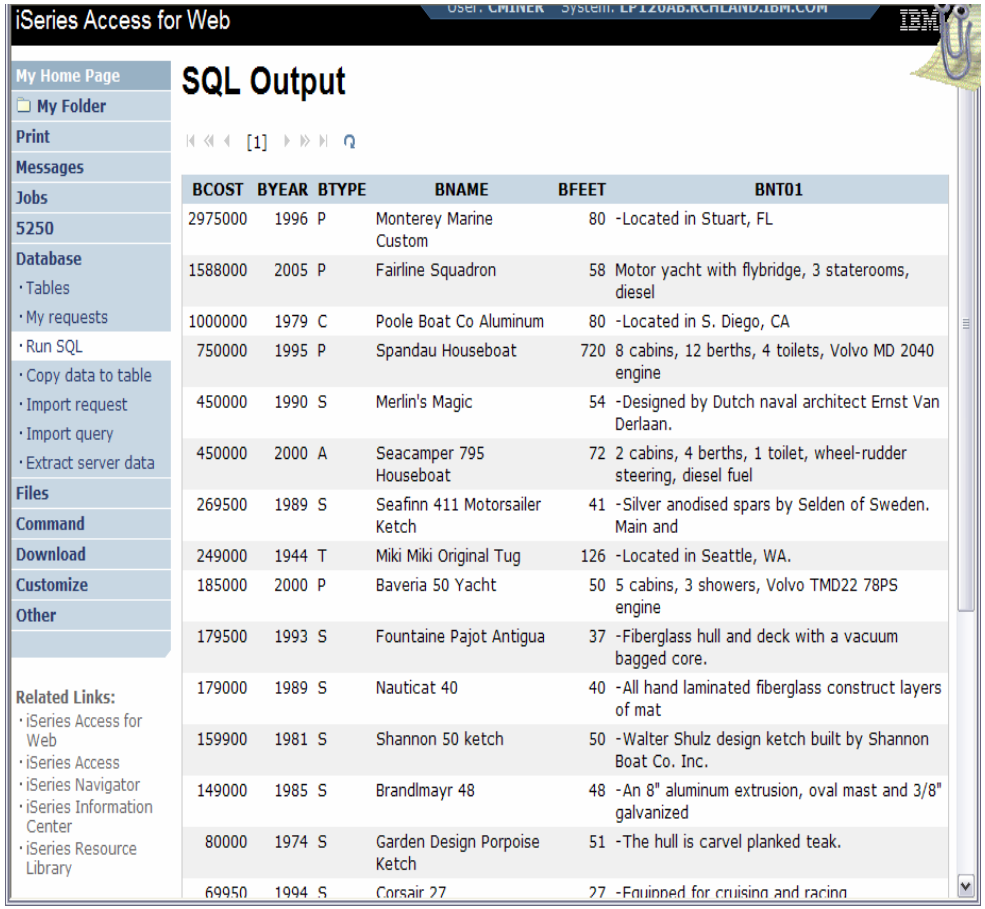
Static Requests

Run a pre-built query or upload

- **Example is a Query that is set up to display up to 500 entries**

This query could be set up to:

- **Be viewed in the browser**
- **Converted to a spreadsheet format, HTML, plain text….**
- **Converted to .PDF**
- **Saved in IFS or Personal Folder**



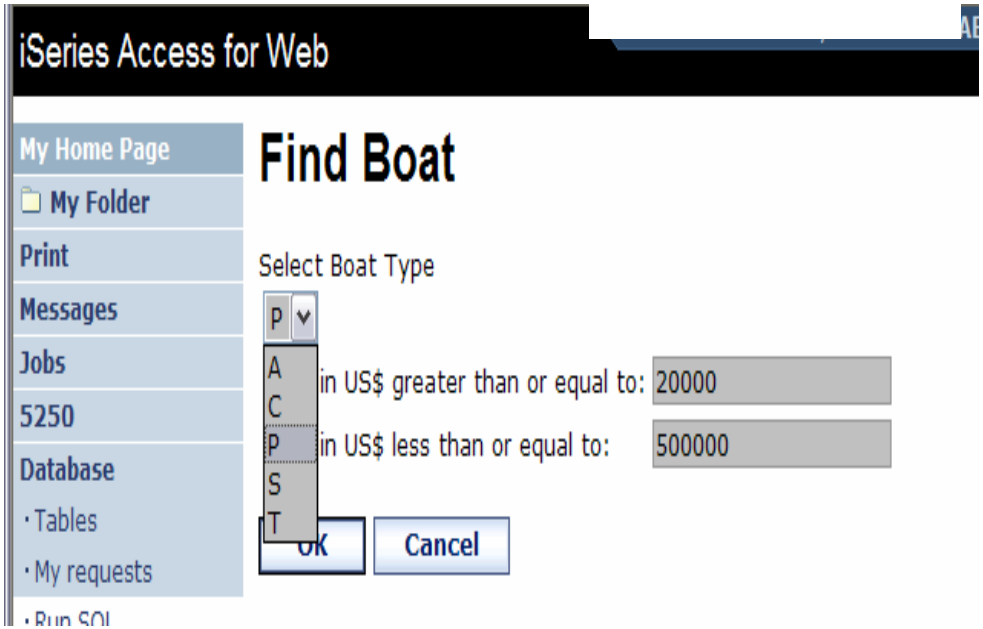
BCOST	BYEAR	BTYPE	BNAME	BFEET	BNT01
2975000	1996	P	Monterey Marine Custom	80	-Located in Stuart, FL
1588000	2005	P	Fairline Squadron	58	Motor yacht with flybridge, 3 staterooms, diesel
1000000	1979	C	Poole Boat Co Aluminum	80	-Located in S. Diego, CA
750000	1995	P	Spandau Houseboat	720	8 cabins, 12 berths, 4 toilets, Volvo MD 2040 engine
450000	1990	S	Merlin's Magic	54	-Designed by Dutch naval architect Ernst Van Derlaan.
450000	2000	A	Seacamper 795 Houseboat	72	2 cabins, 4 berths, 1 toilet, wheel-rudder steering, diesel fuel
269500	1989	S	Seafinn 411 Motorsailer Ketch	41	-Silver anodised spars by Selden of Sweden. Main and
249000	1944	T	Miki Miki Original Tug	126	-Located in Seattle, WA.
185000	2000	P	Baveria 50 Yacht	50	5 cabins, 3 showers, Volvo TMD22 78PS engine
179500	1993	S	Fountaine Pajot Antigua	37	-Fiberglass hull and deck with a vacuum bagged core.
179000	1989	S	Nauticat 40	40	-All hand laminated fiberglass construct layers of mat
159900	1981	S	Shannon 50 ketch	50	-Walter Shulz design ketch built by Shannon Boat Co. Inc.
149000	1985	S	Brandlmayr 48	48	-An 8" aluminum extrusion, oval mast and 3/8" galvanized
80000	1974	S	Garden Design Porpoise Ketch	51	-The hull is carvel planked teak.
69950	1994	S	Corsair 27	27	-Equipped for cruising and racing

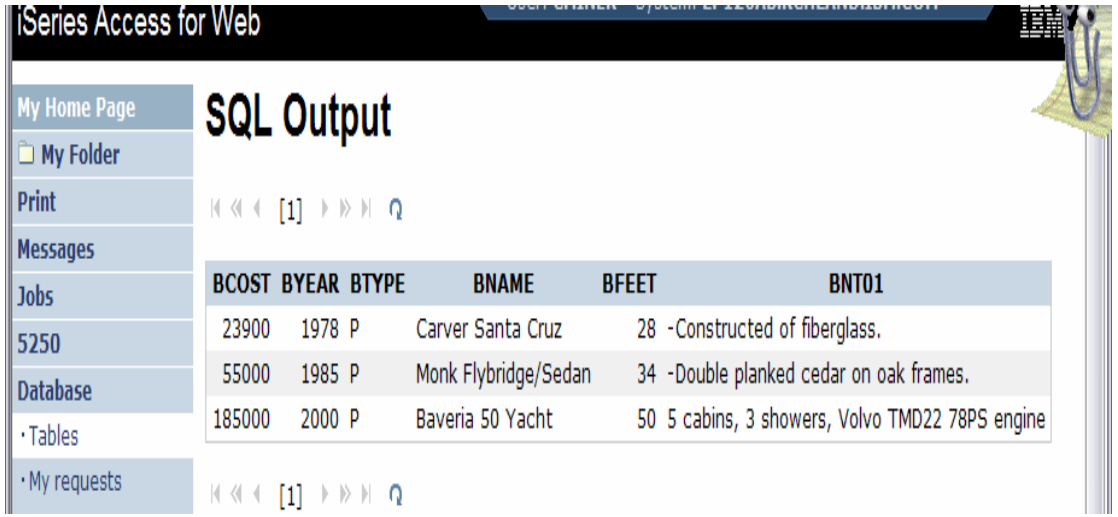
Dynamic Query

Example has conditions the end user can set:

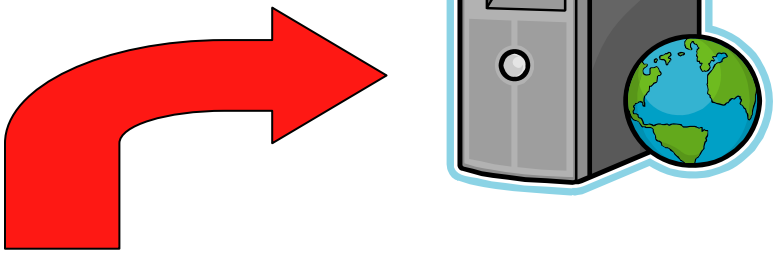
1. **Type of boat (Power, Sailing, etc)**
2. **Price limits (lower / upper)**

Query brings back only database entries meeting conditions





Upload PC data to DB2 for i5/OS

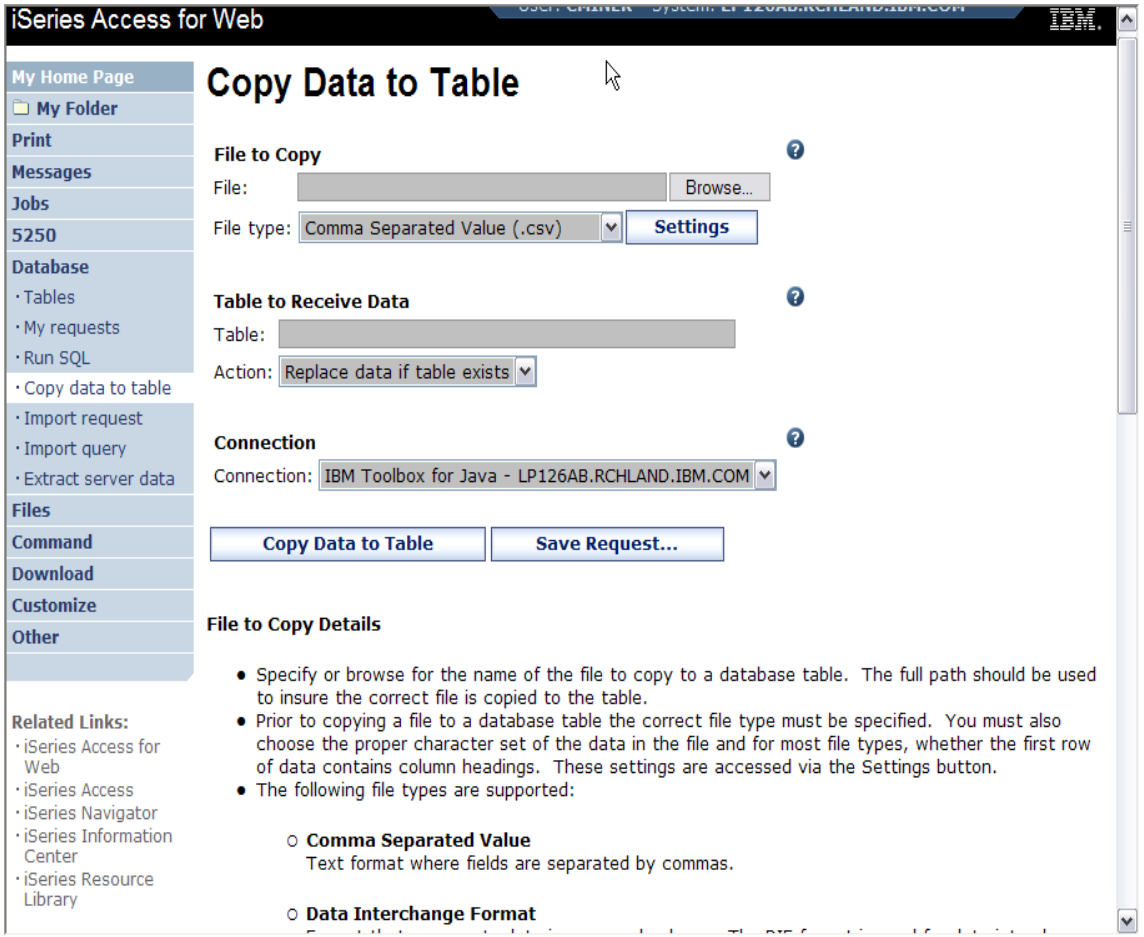


Copying Data to DB2 for i5/OS

Copy data to table function allows you to copy PC data into a DB2 for i5/OS table

Specify:

- **File name**
- **File type**
- **File settings**
- **Table name**
- **Replace or append records to table**
- **Connection**



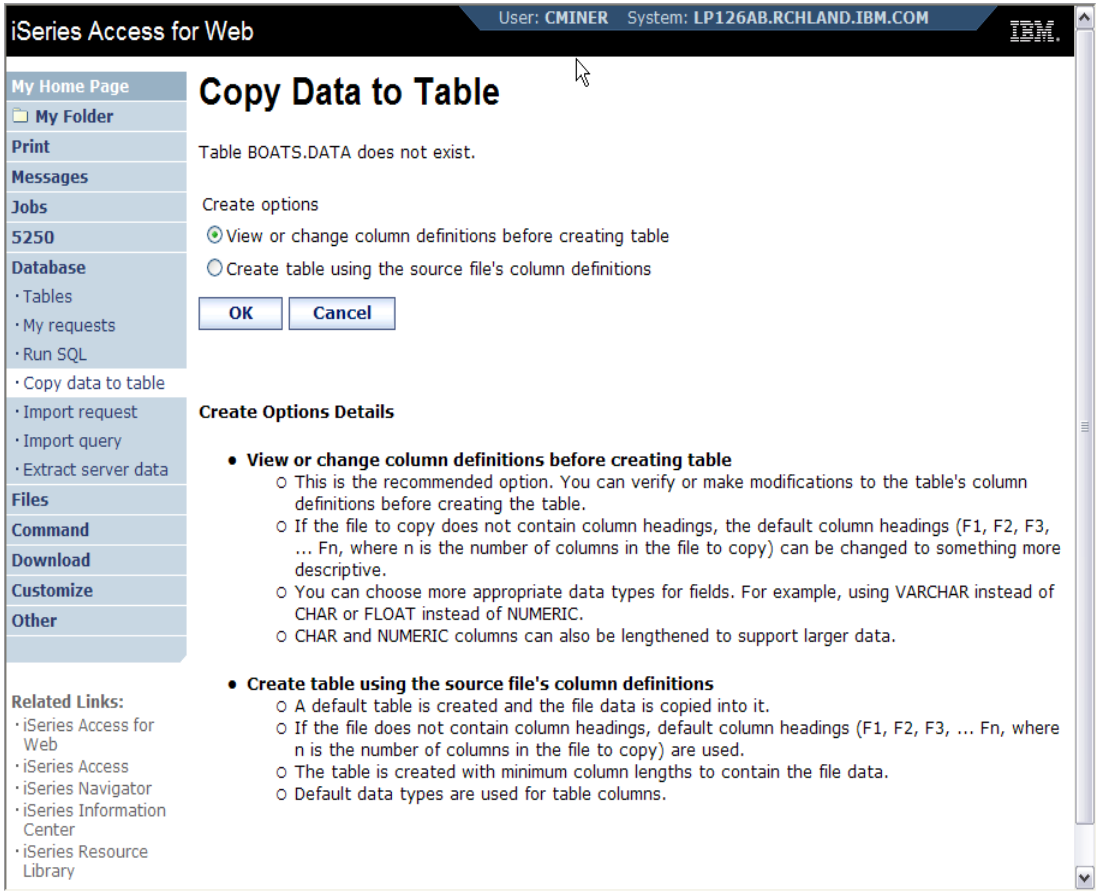
Creating a new table

Copy data to table will create a new table if one does not exist

Choose to view or change the table definition

or

To simply create the table using the default definition determined by System i Access for Web

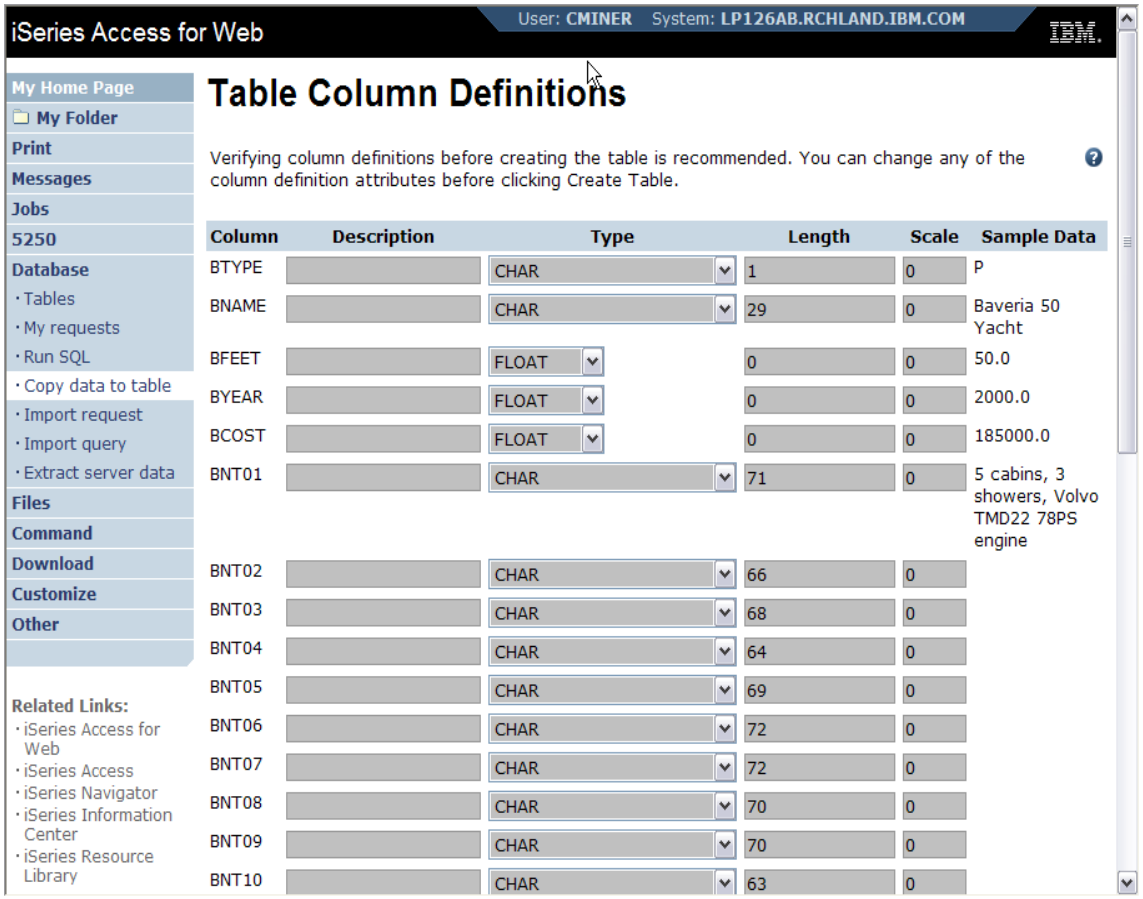


Creating a new table

Verify Column Definitions for A New Table

From this panel you may add a description, change data types, column length, and scale

Click Create Table to create the new table and copy your data to the new table

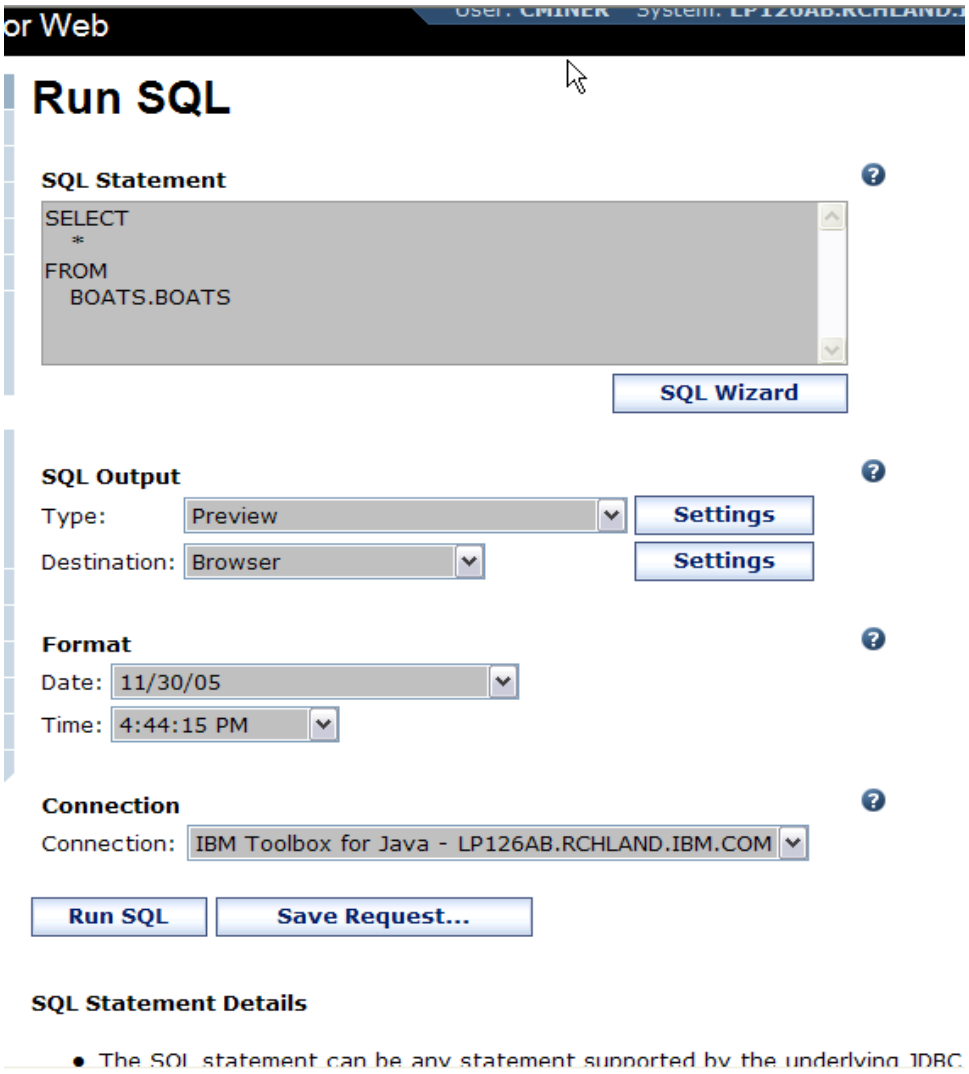


Query DB2 for i5/OS

Run SQL

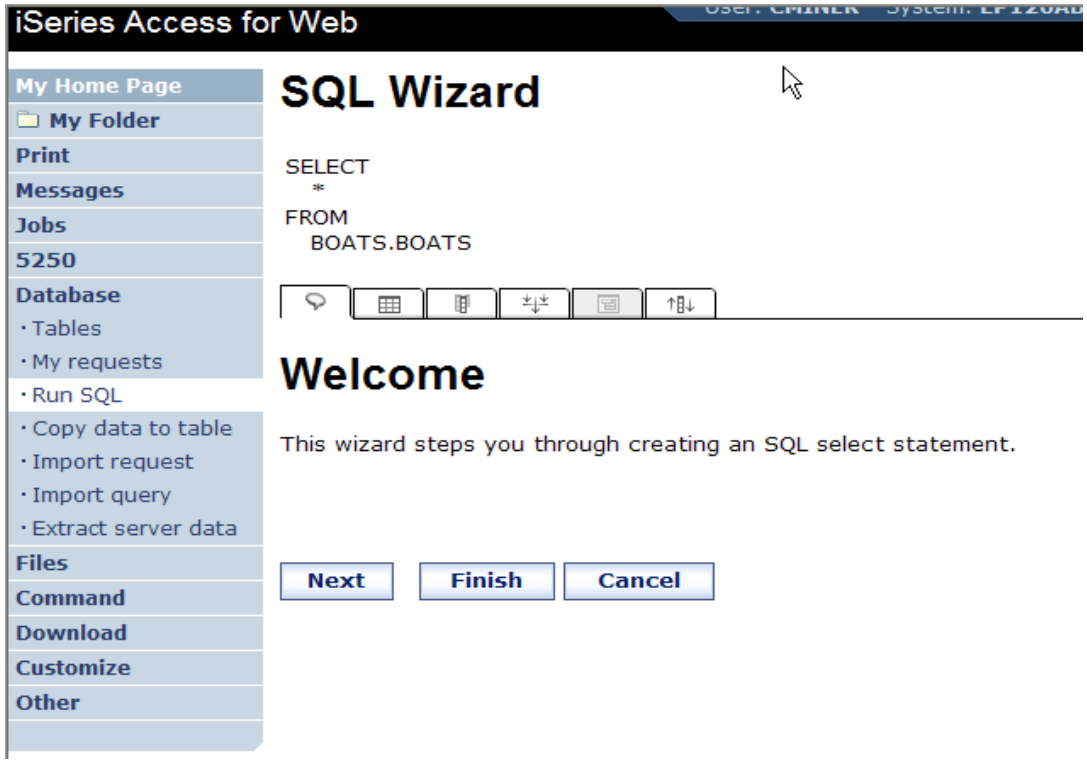
The Run SQL function allows you to type in a free-form SQL Statement

- **If you do not know SQL, then use the SQL Wizard to help you generate an SQL SELECT statement**
- **Select from a variety of output formats, including:**
  - **Preview**
  - **PDF**
  - **.XLS (Excel)**
  - **XML**
  - **HTML**
  - **…**



The SQL Wizard

The SQL Wizard helps you generate a single table SELECT statement



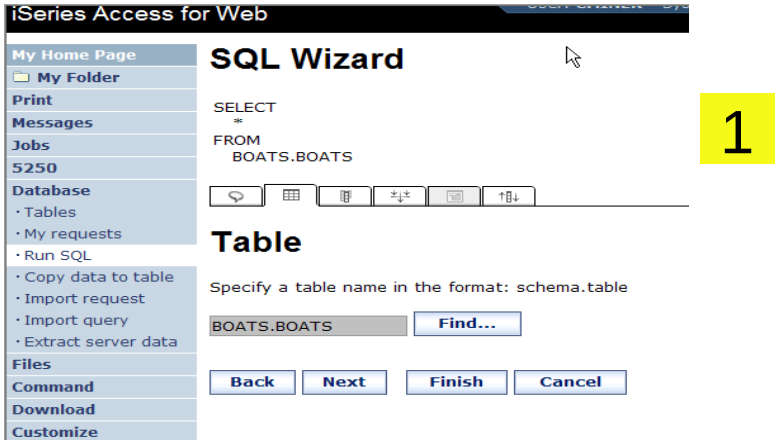
Identify the DB2 for i5/OS database table

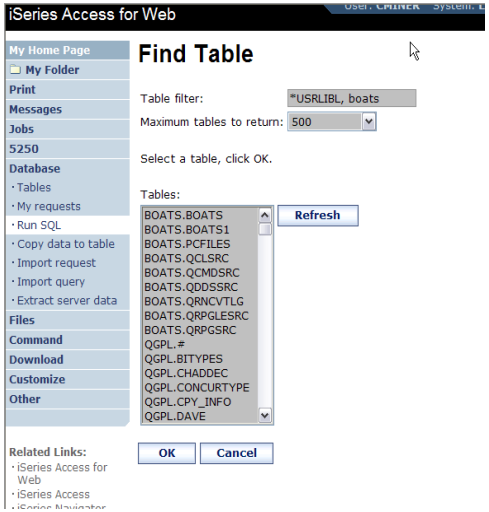
Step 1:

Choose a table

Type in a table filter to help narrow your search. Many schemas (libraries) may be specified by putting them in a comma separated list

Select a table and click OK to use it to generate the SELECT statement



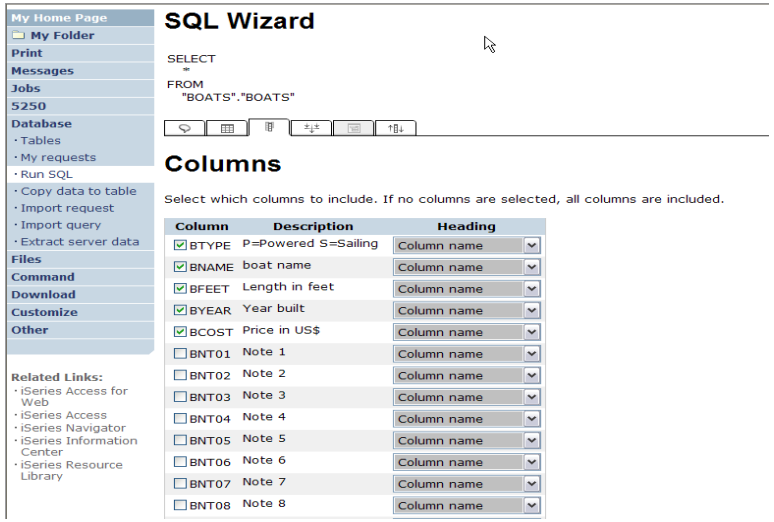


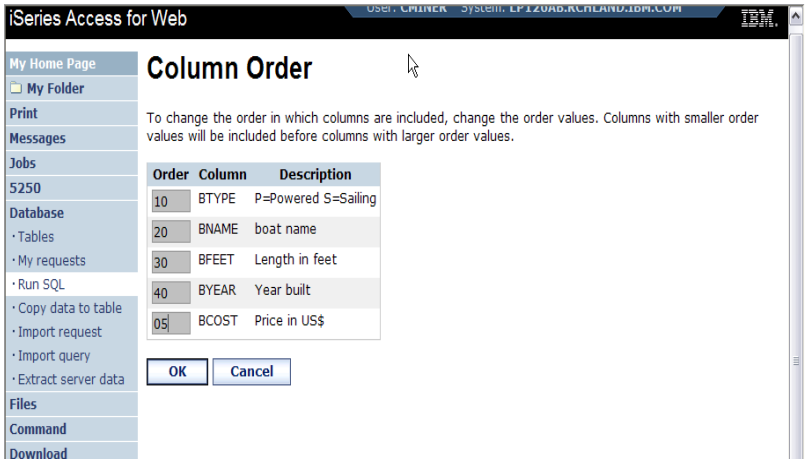
Select your Output Columns

Step 2:

Choose columns

- **Check the boxes next to the columns to include them in the statement**
  - If you check none, you get all columns
- **Click the column order button to change the order output**
  - Changed Price from 50 to 05 so it would be first



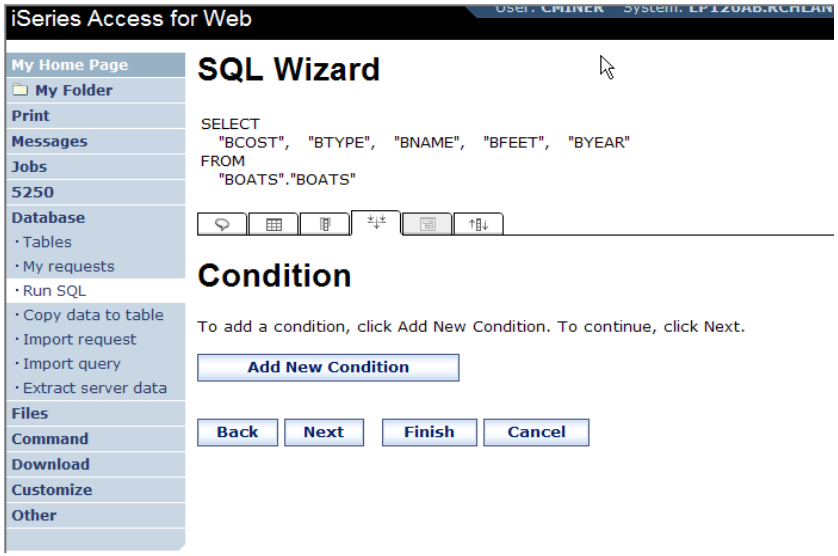


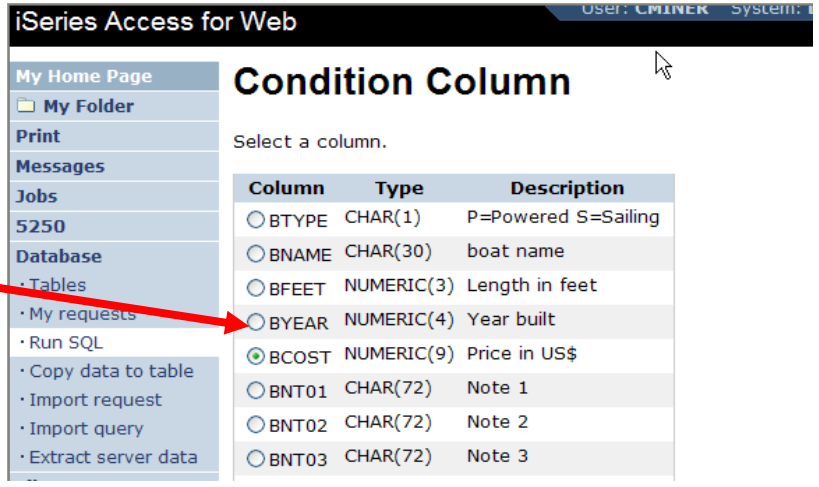
Specify Conditions

Step 3:

Adding conditions

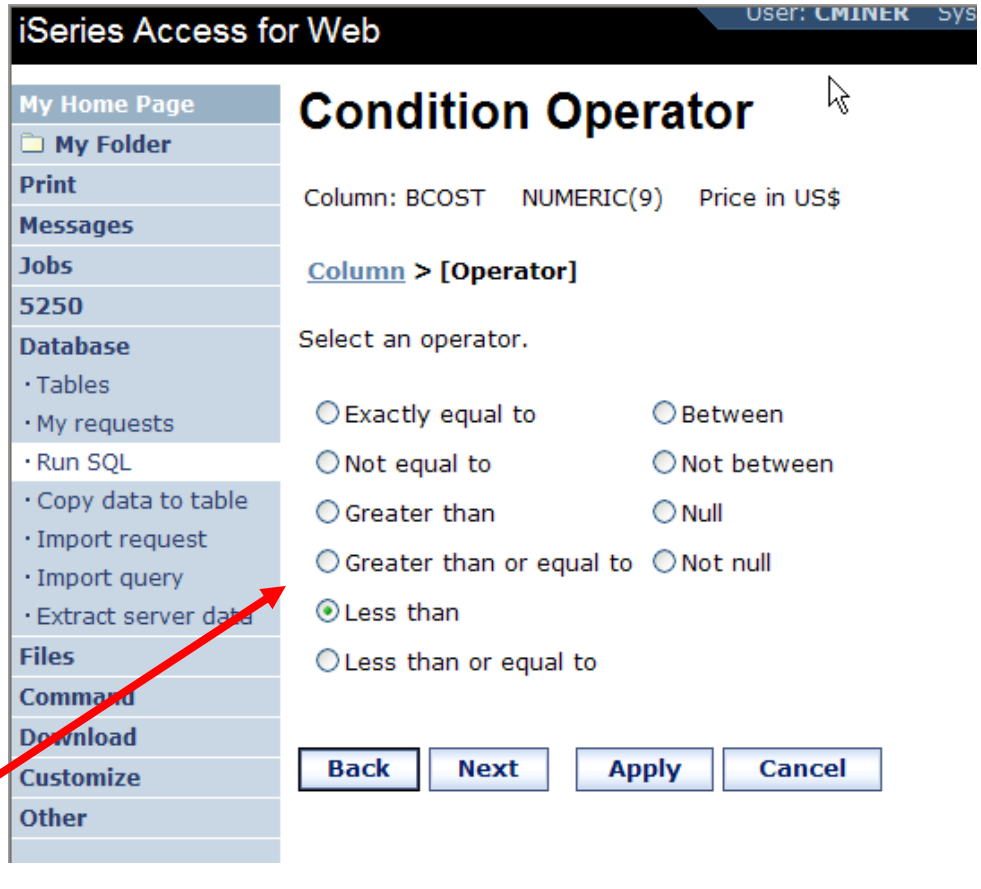
- Conditions allow you to select records that meet certain criteria.
- Click Add New Condition to specify a condition.
- Select the column to use in the condition and click Next





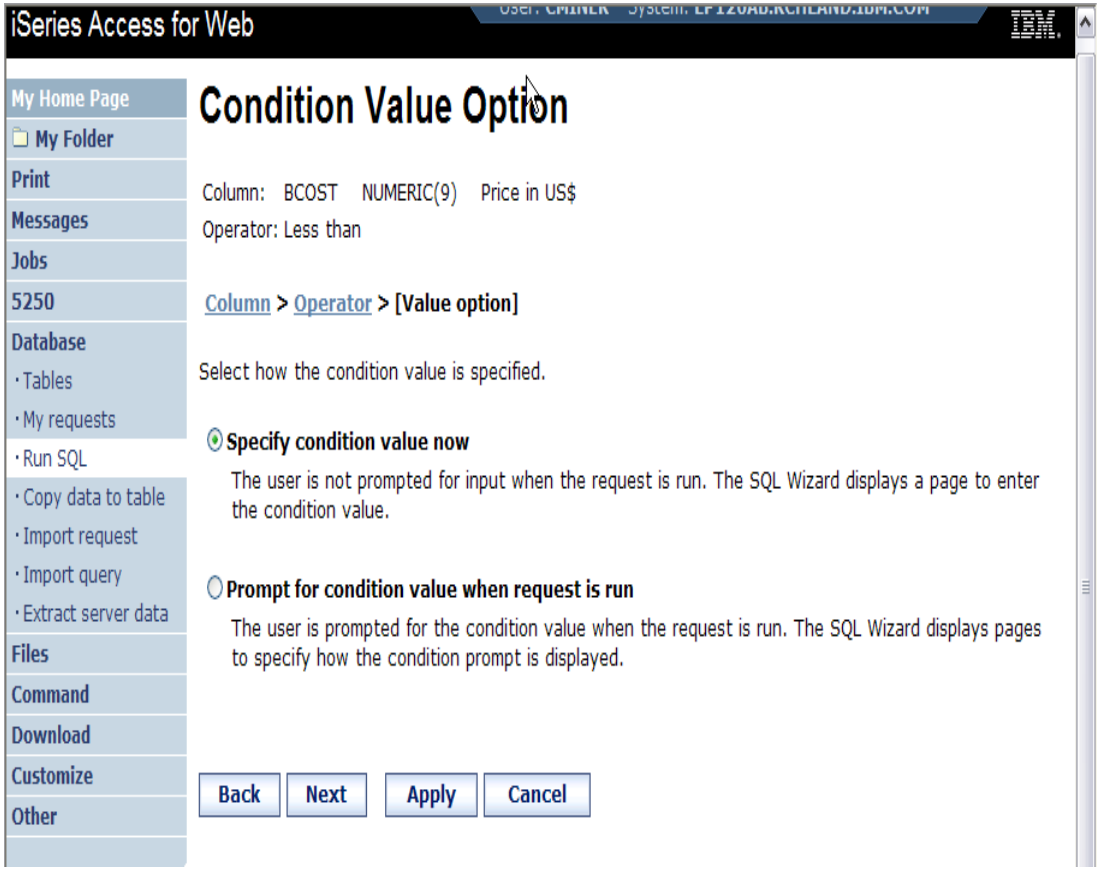
Choose the operator type

- The SQL wizard allows you to choose the operator to use in the condition
- The condition shows up both in the SQL and in a condition list. You may edit or delete the condition.
- You may also add additional conditions.



Choose static versus dynamic

- **The SQL wizard allows you to choose if the condition value is specified in the request, or is prompted for when the request is run.**
- **Static or Dynamic**

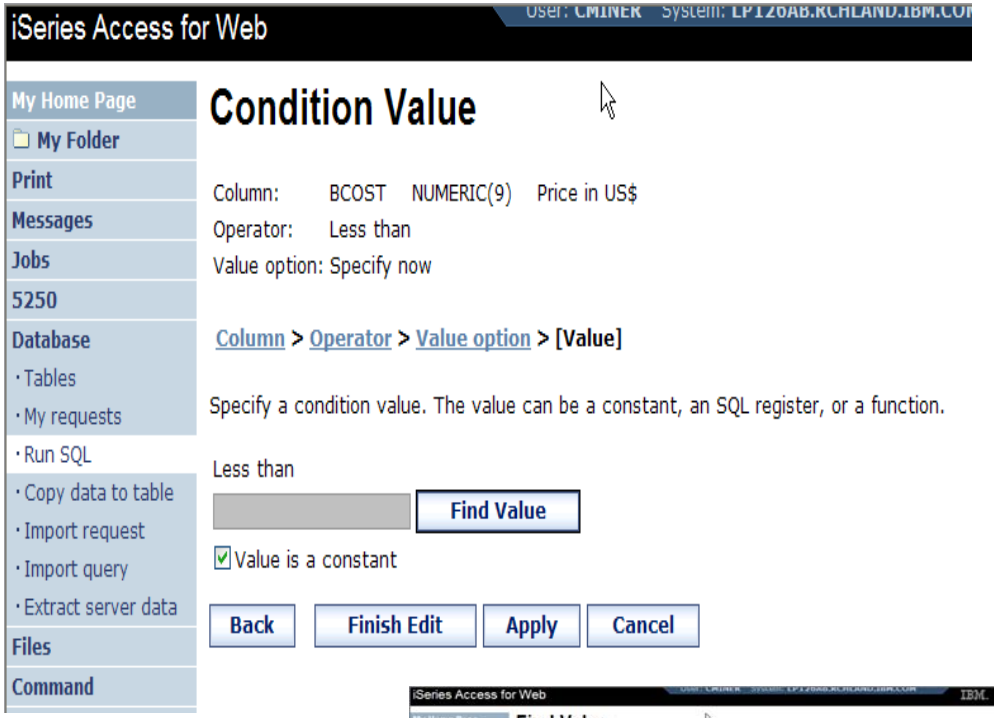


Specifying a Static Value

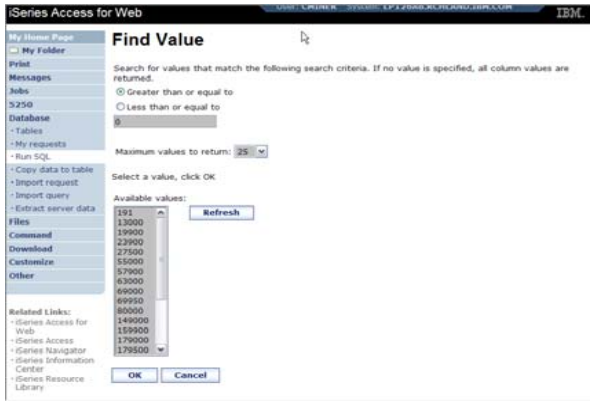
The SQL wizard allows you to specify the value for the condition.

The value can be:

- **Constant or**
- **Other specific function**

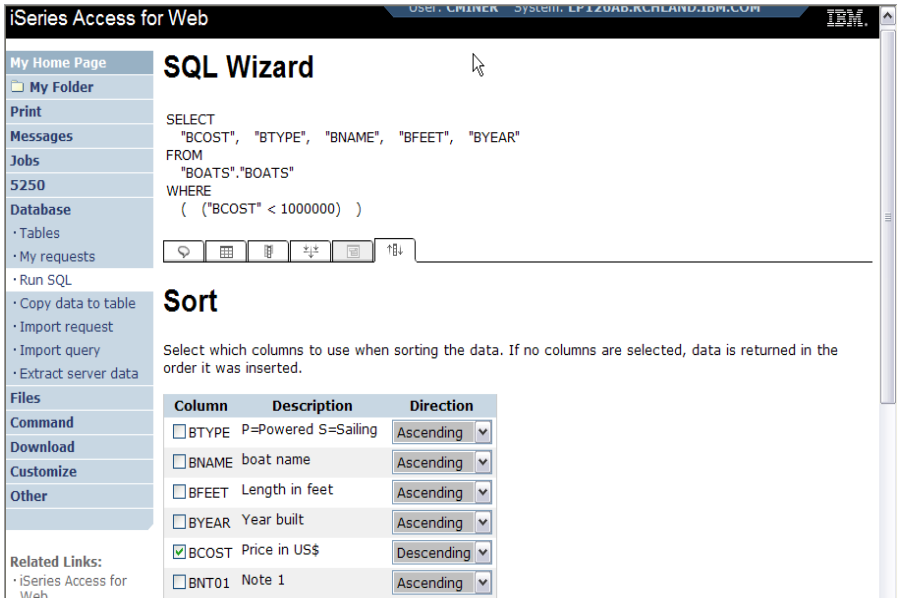


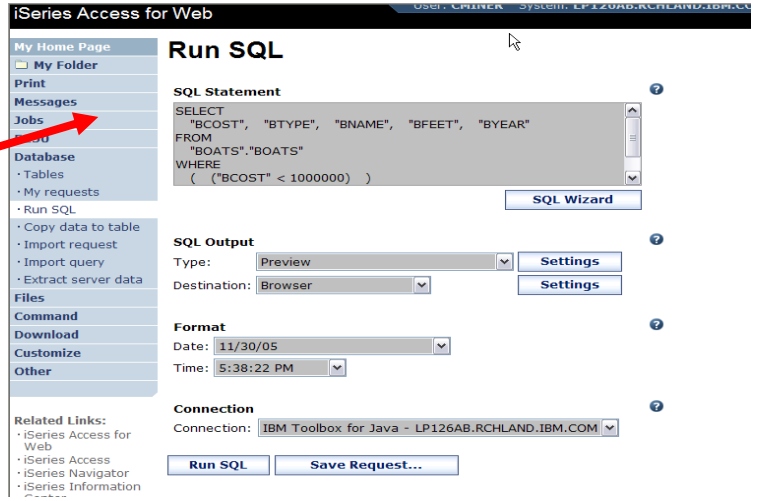
Can find values in table



The statement is complete!

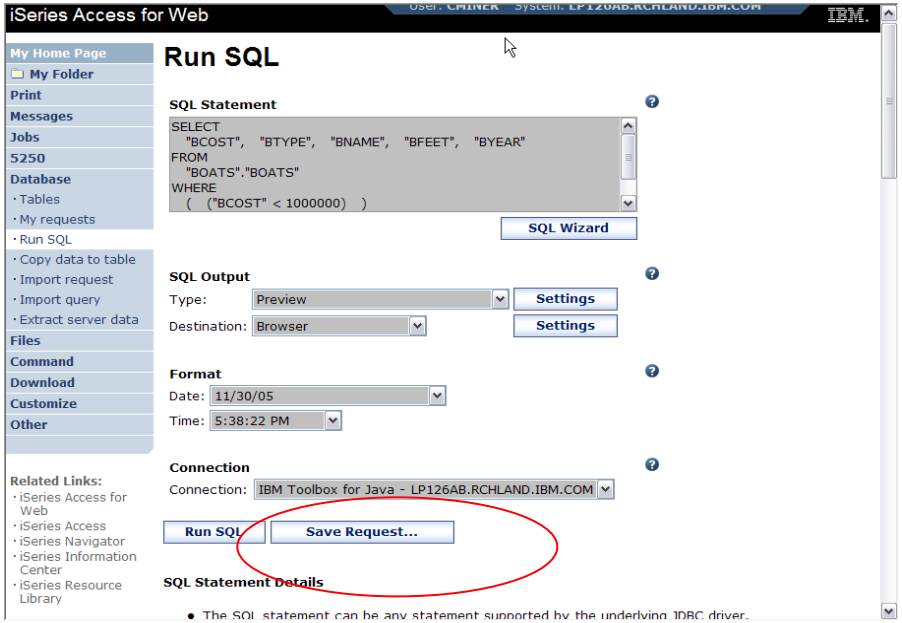
- The statement is now complete.
- Click the Finish button (not shown) on the bottom of the SQL Wizard page to return to Run SQL
- The SELECT statement you generated is available for use in Run SQL





Save the SQL Request

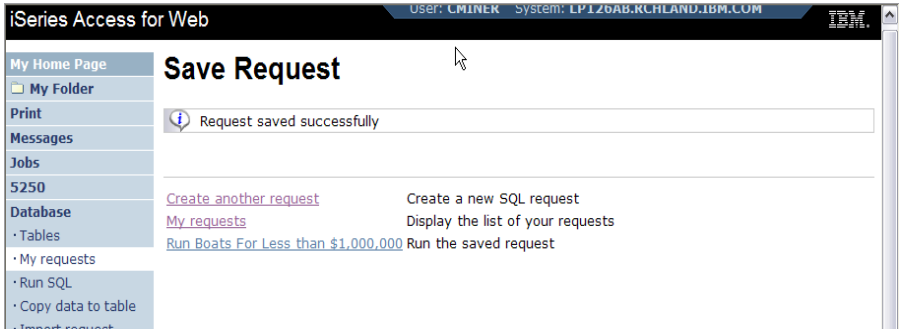
After creating a statement (by hand or with the SQL Wizard) you have the option to save it later use



Can Run it now

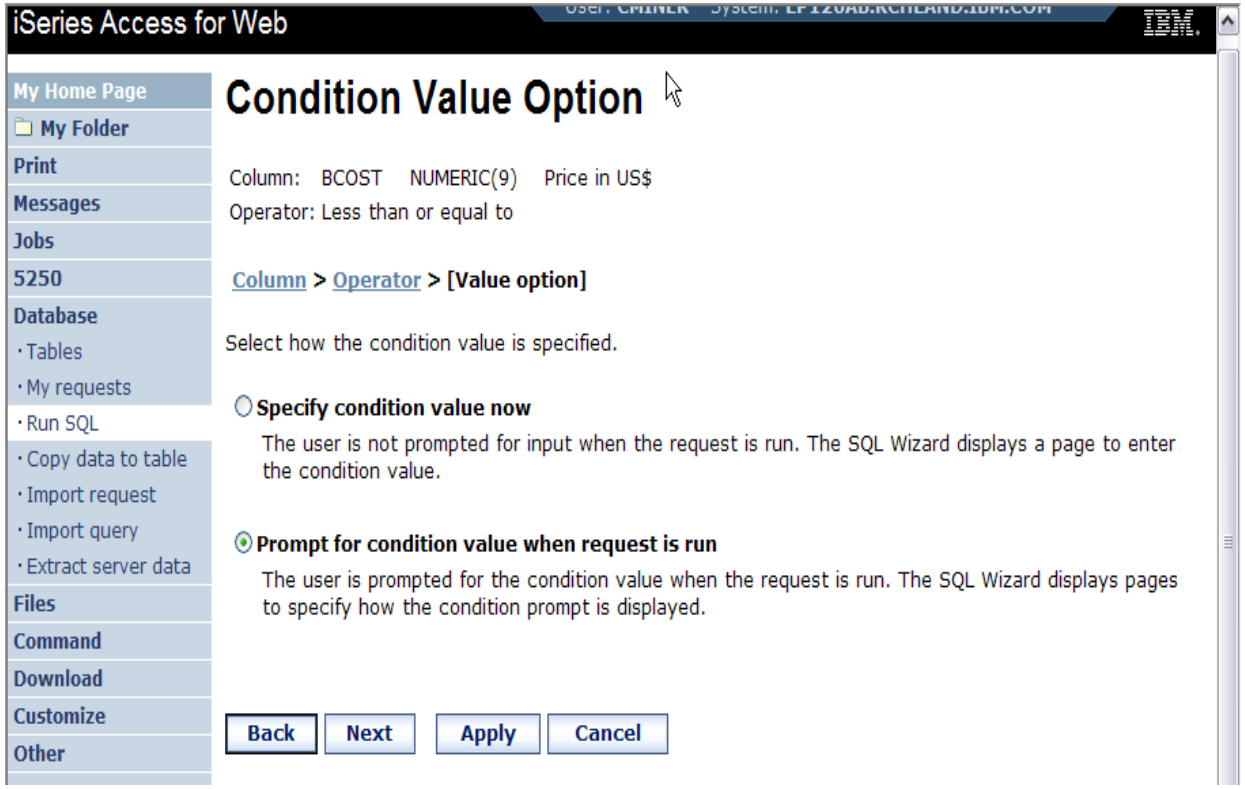
Or

Run it later from “My Requests”



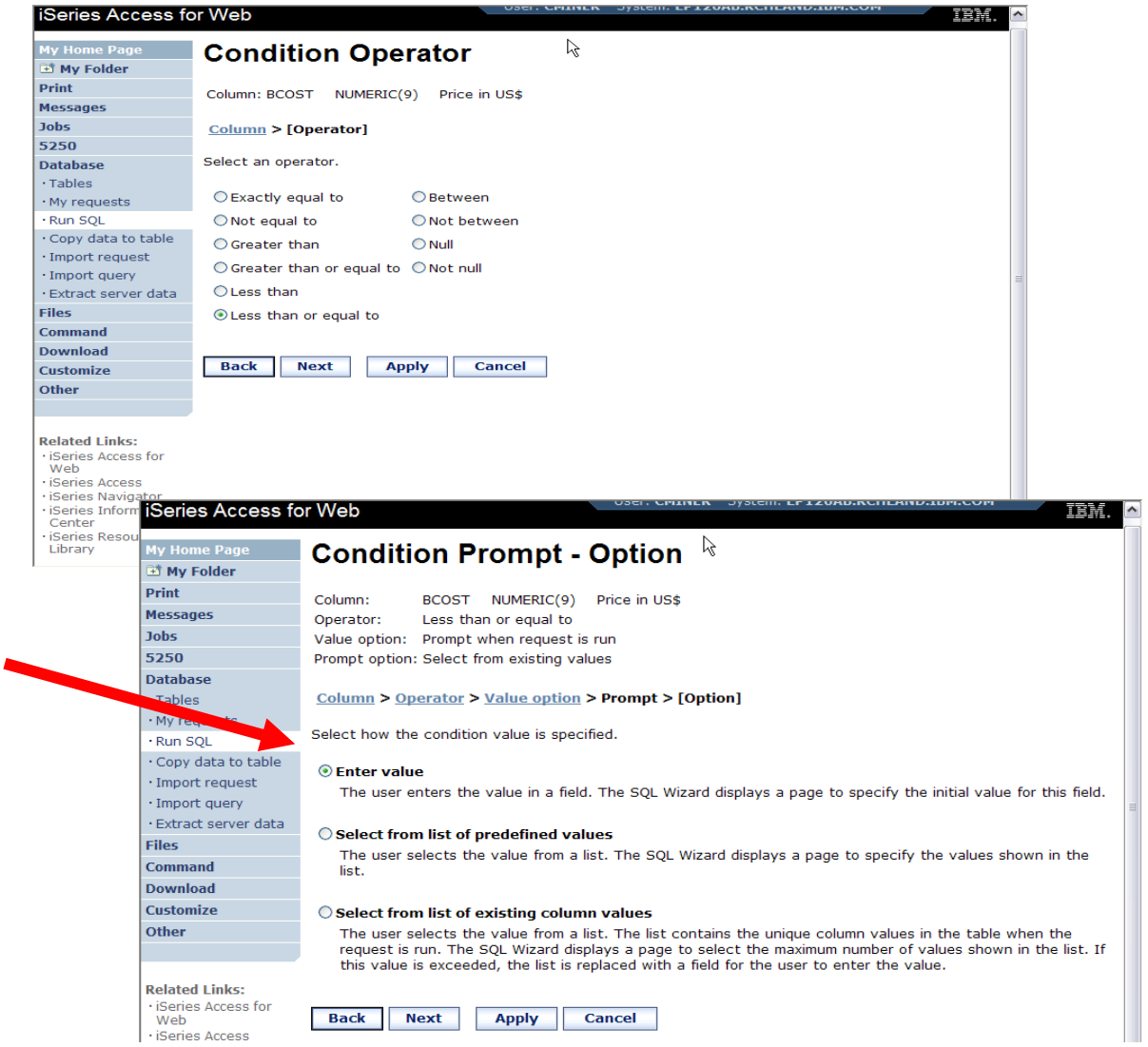
Dynamic Query – condition value

Select to prompt for values when the request is run



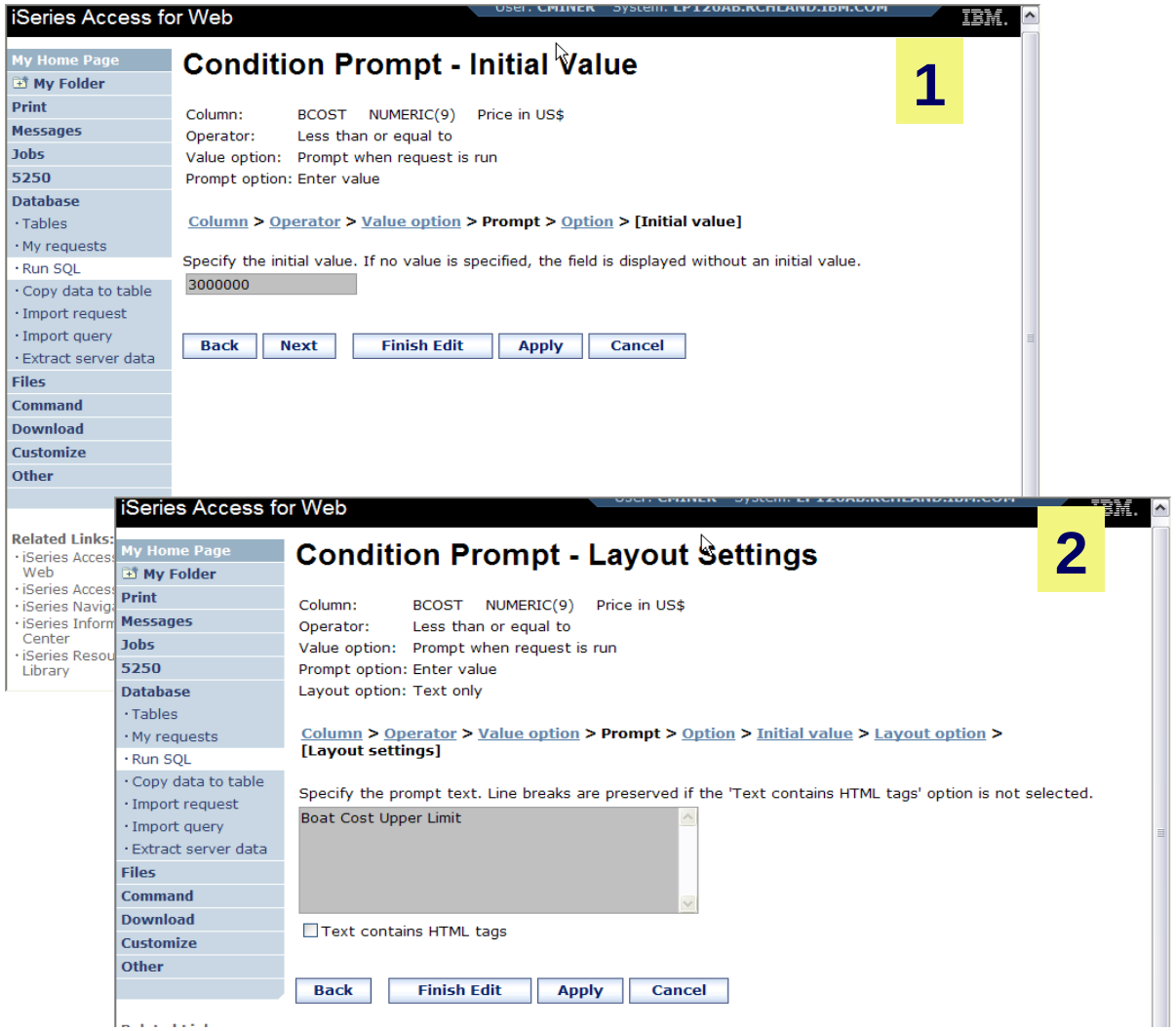
Chose Operator and Prompt Type

- **Choose a comparison operator just like we did in the static query example**
- **Select how the user will be prompted for the values**



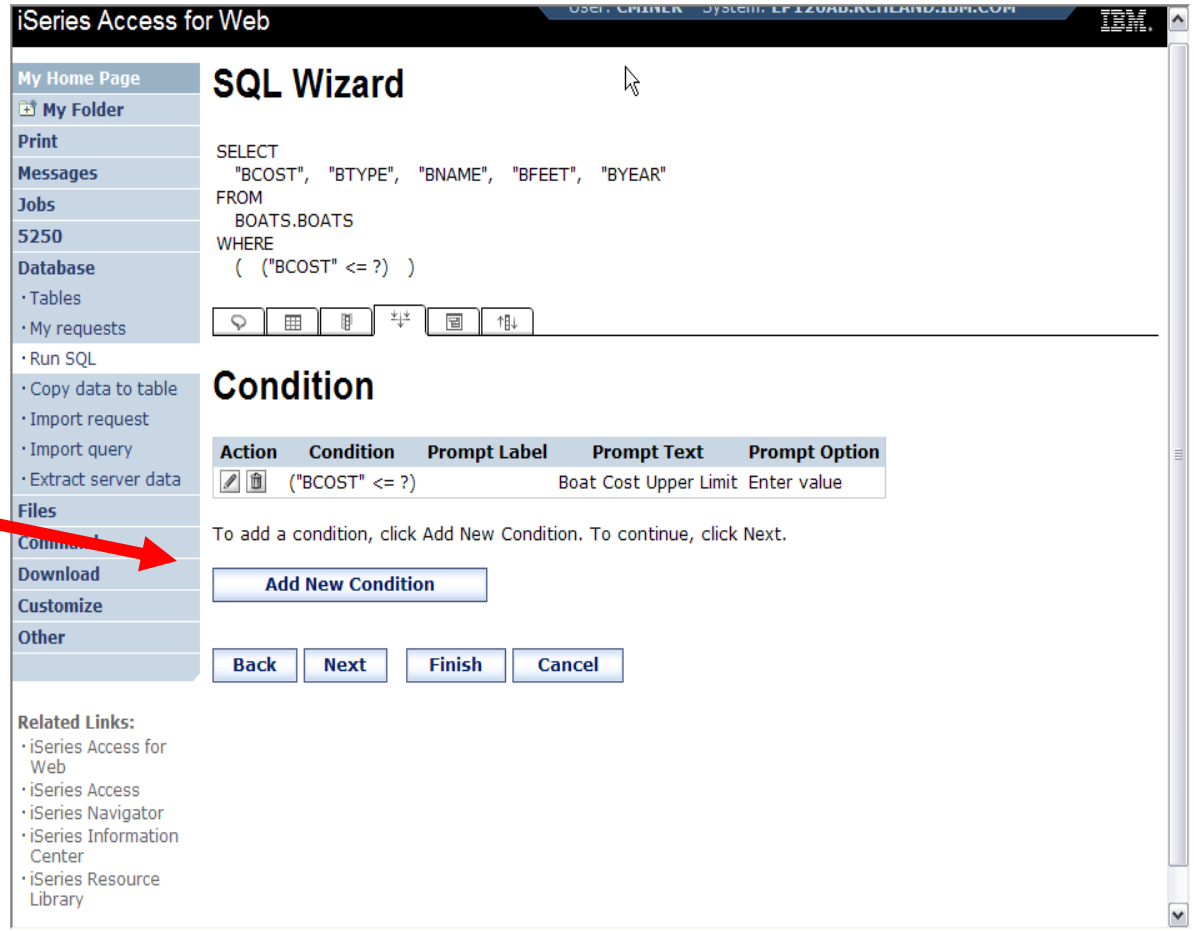
Chose Operator and Prompt Type

- **Setting Initial Value that Boats can cost equal to or less than $3,000,000**
- **Adding Text to explain to user what to enter in this column**
- **User can then change value**



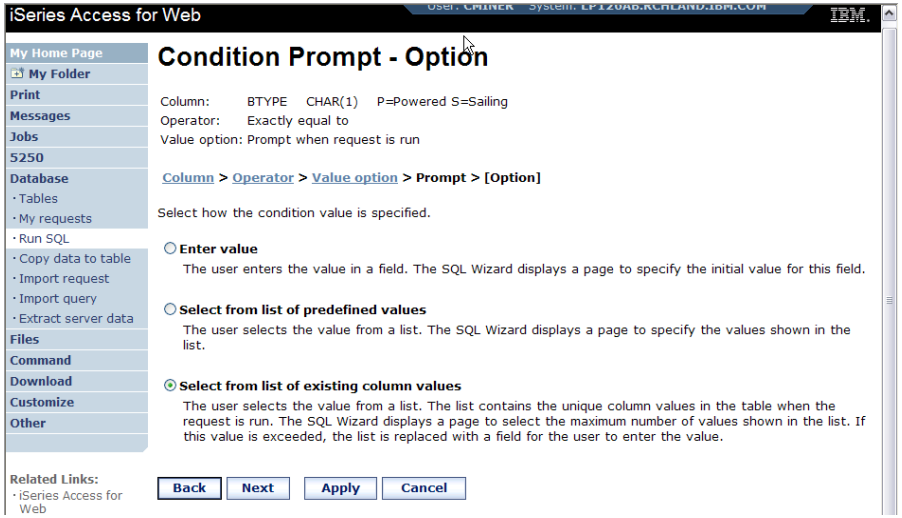
Can Include Multiple Conditions on Dynamic SQL Requests

- **Let's add another condition to this Dynamic SQL Request**

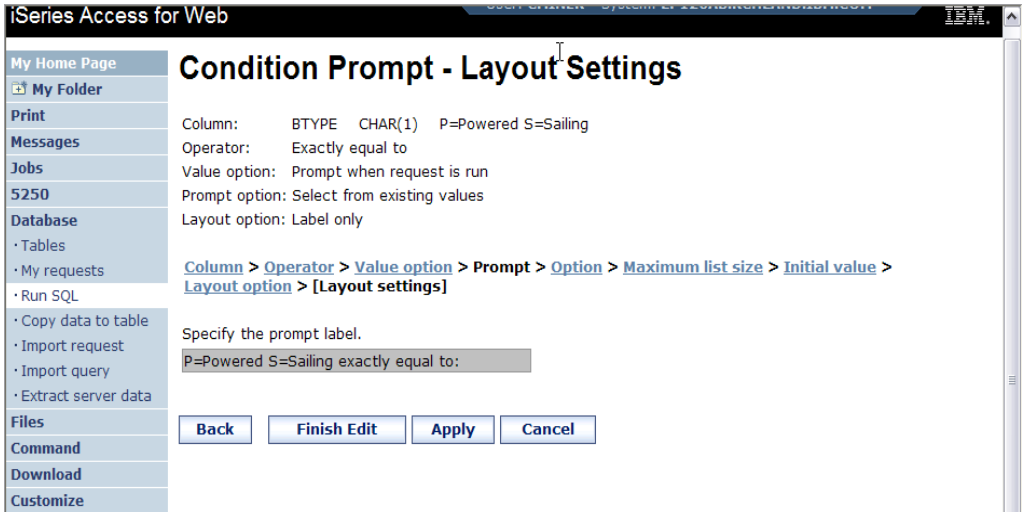


Setting up Additional Operator and Prompt Type

- For ‘Type of Boat’, we will select from list of Types in our Database File

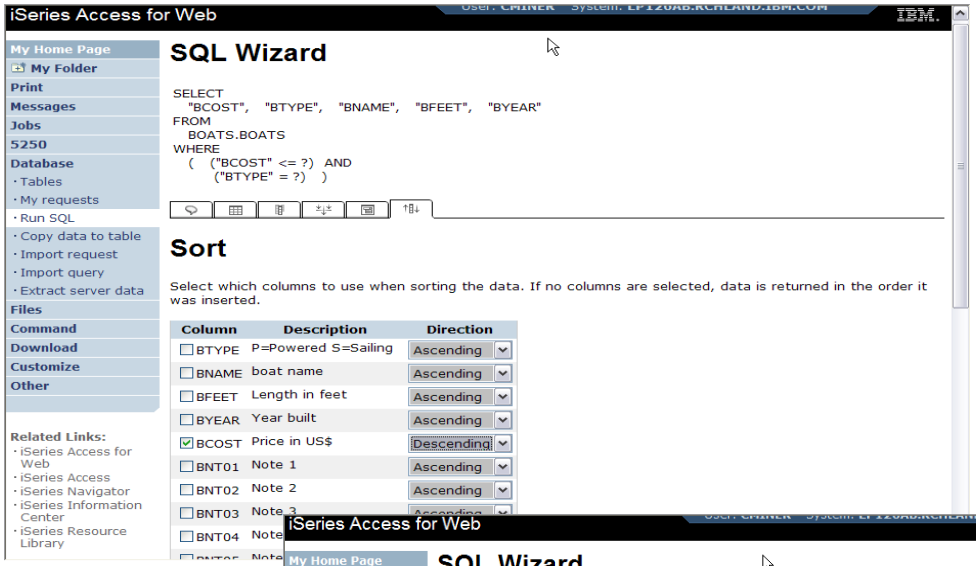


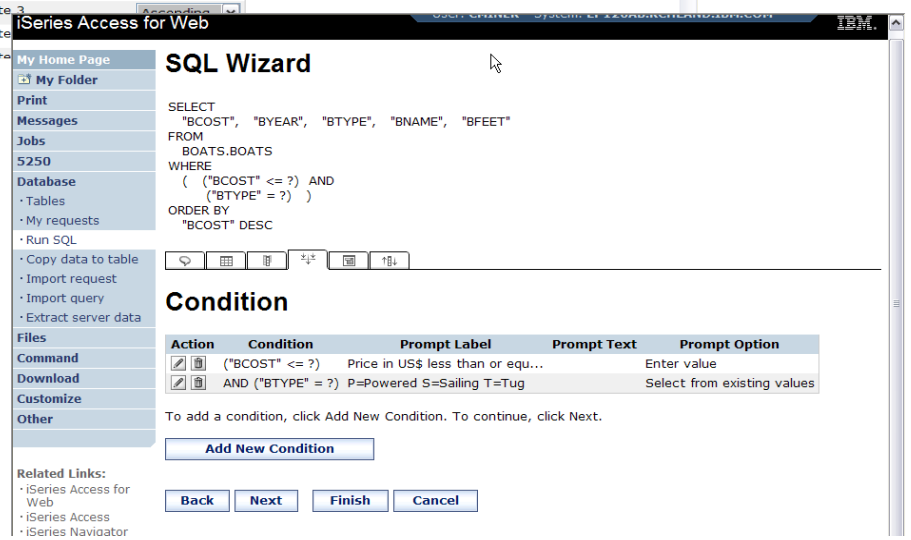
- Two (2) types of boats in the database file



Set Display Order and See Conditions Set

- **Will display information based on 'Boat Cost' in descending order**
- **Shows how SQL has been written based on 2 Conditions**

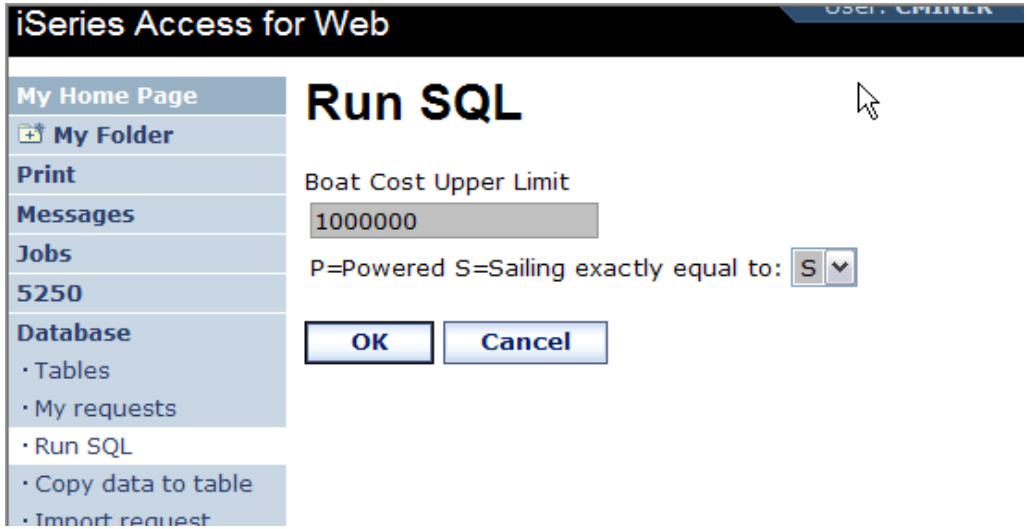




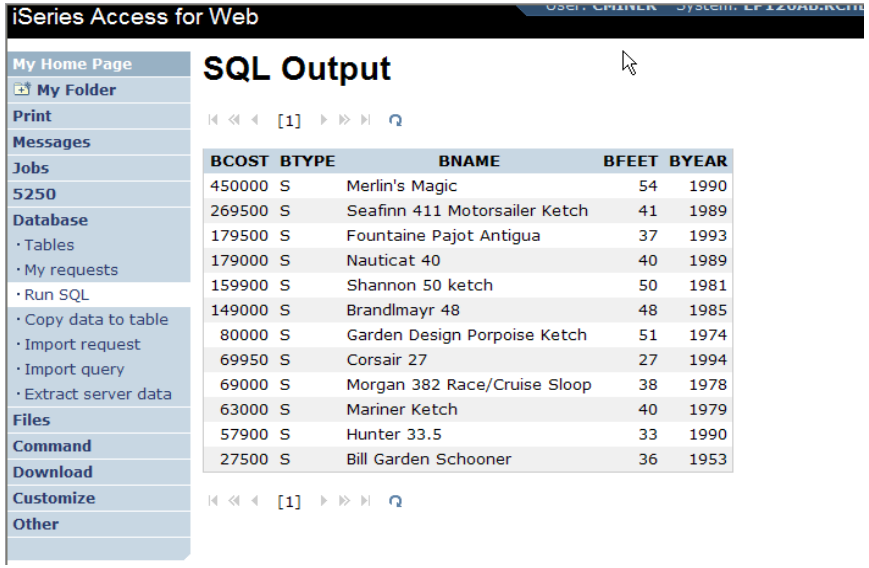
User Runs Dynamic Query built with 2 Conditions

User selects

- **Maximum cost of boat**
- **Type of Boat**

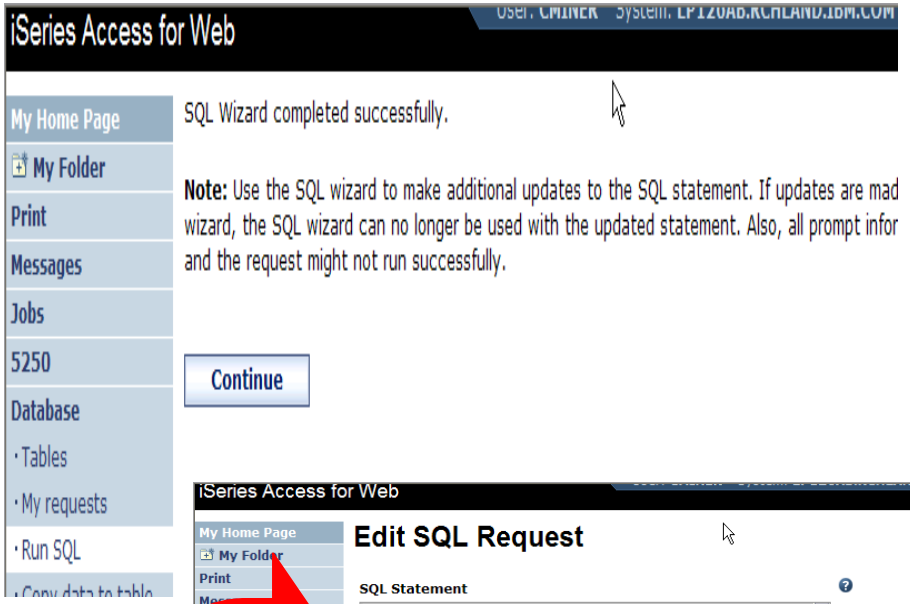


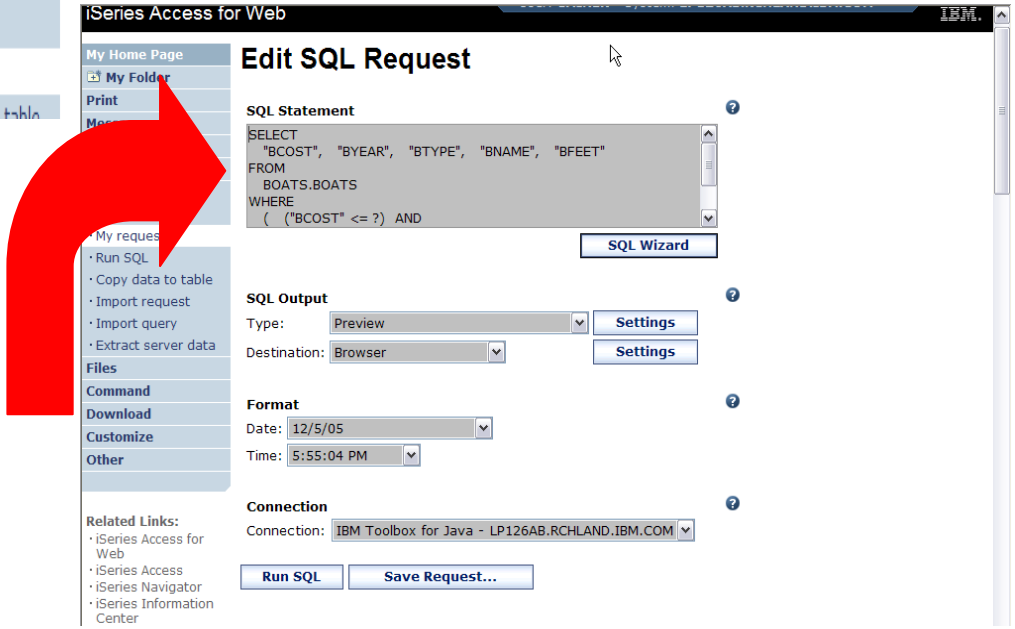
The SQL Output was set up to show in Descending Order by Boat Cost



Dynamic query – wizard warning

- **Dynamic queries generated by the wizard can only be modified using the wizard**
- **If you wish to create your own you will need to manually add parameter markers directly into the SQL statements and create your own web page to prompt for the values**





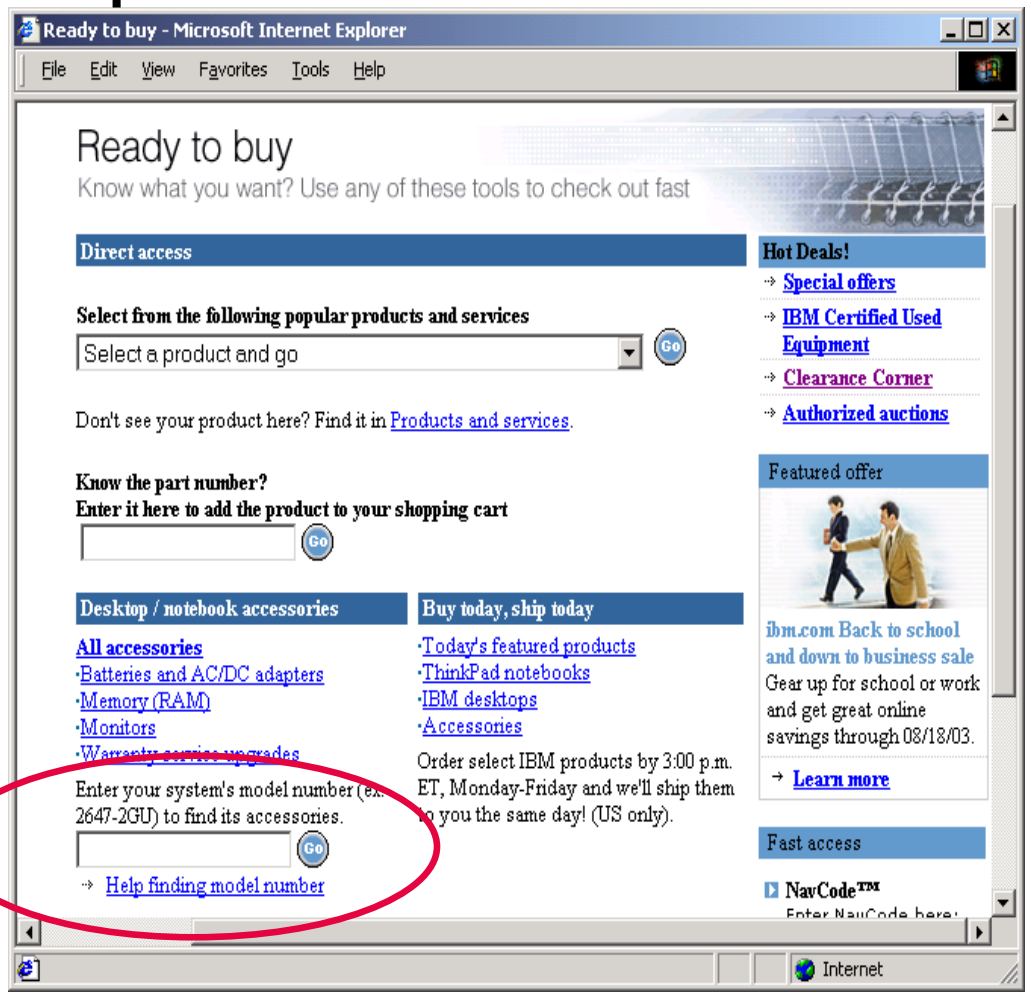
Dynamic Query – Form Example

- Want to use different button style
- Want button next to prompt control, not underneath it

- Form element:
  - <FORM name=accessories action="http://server/webaccess/iWADbExec" method="get">

- Hidden element:
  - <input type="hidden“ name="request" value="req" />

- Entry field:
  - <input type="text"
  - name="iwaparm_1" value="" />



Great way to add Database requests to your existing web pages

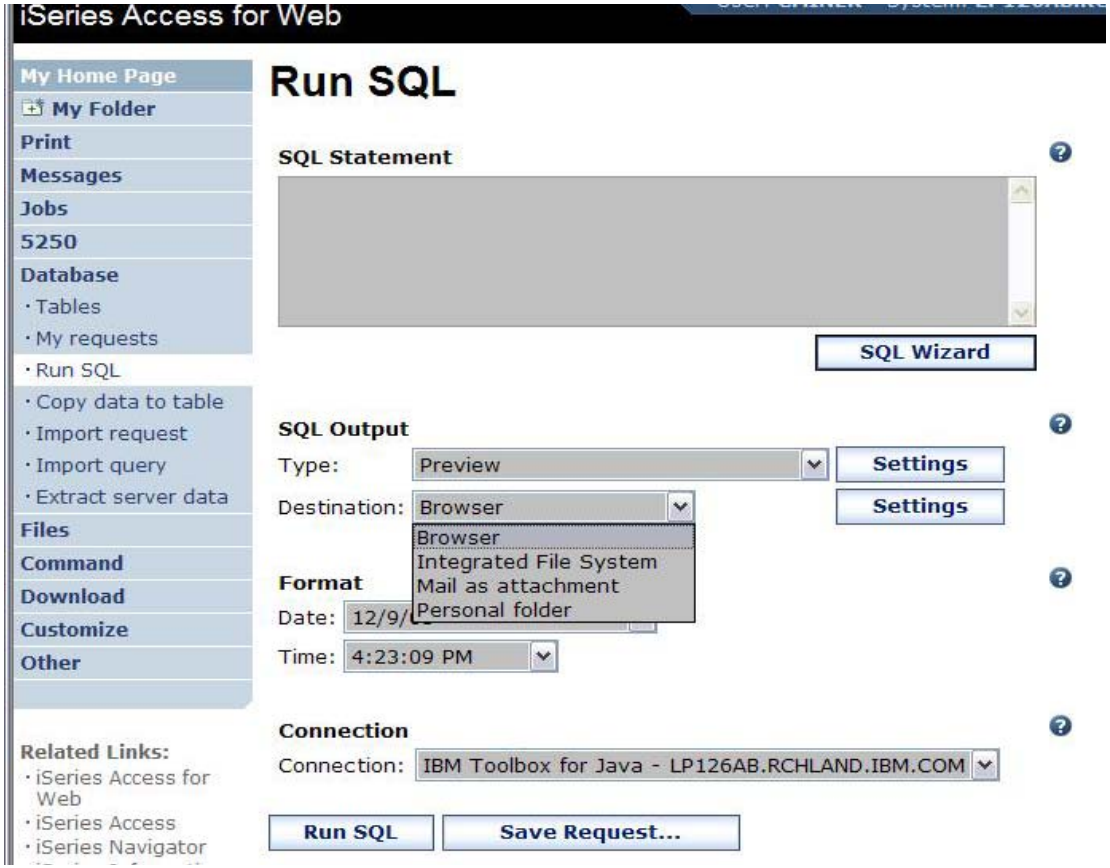
SQL Output Destinations

SQL Output Destinations

Choosing a destination

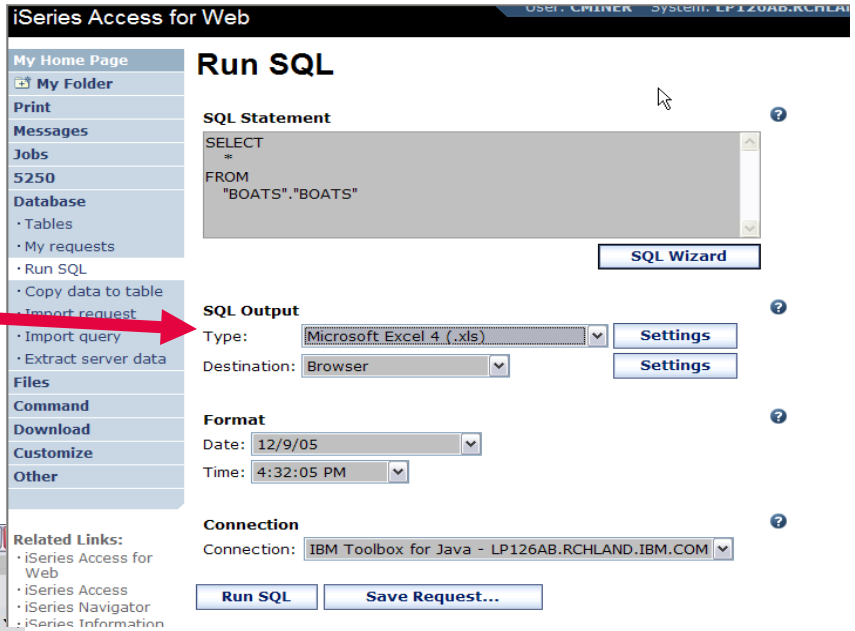
Choose from 4 different output destinations:

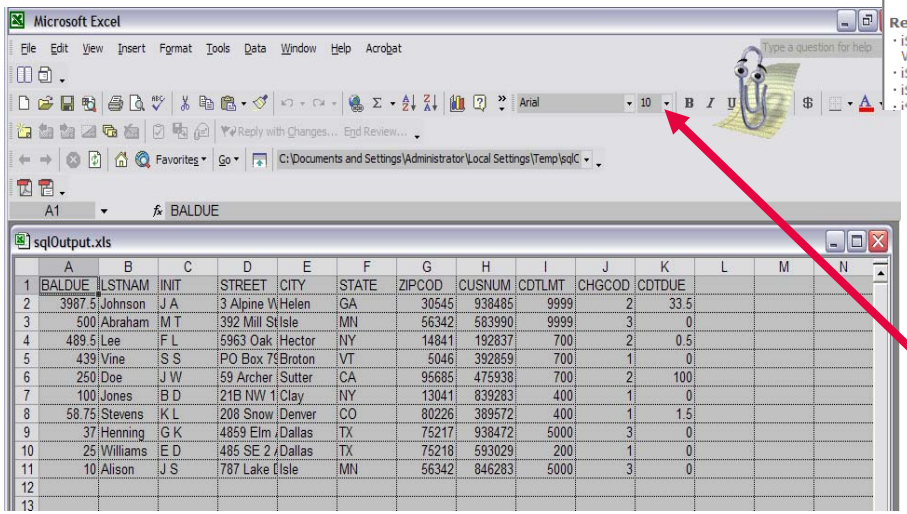
- **Browser**
- **Email**
- **Personal folder**
- **Integrated File System** *V5R4*



Run SQL – Output Browser

The SQL statement is built indicating that Output Type is Microsoft Excel.





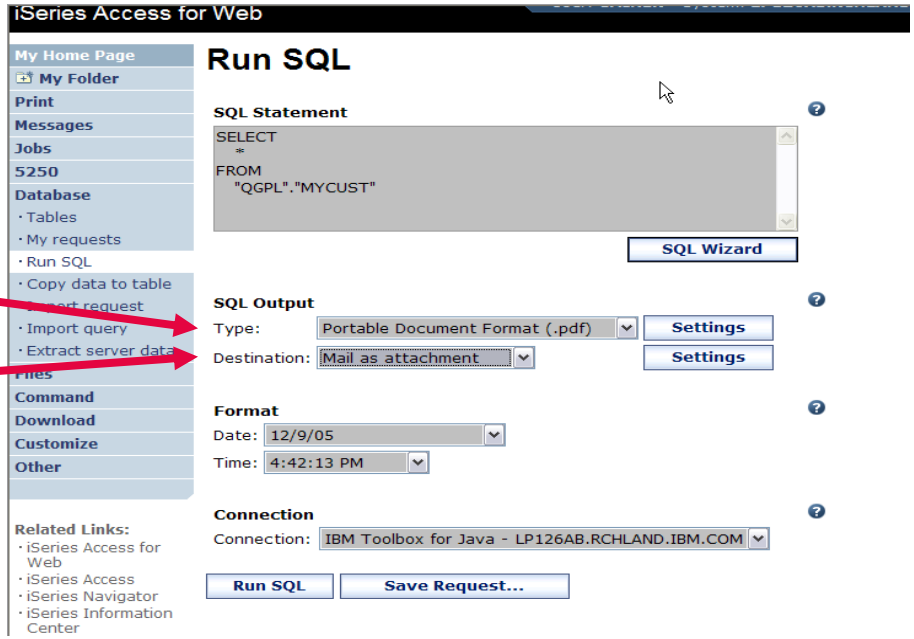
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	BALDUE	LSTNAM	INIT	STREET	CITY	STATE	ZIPCOD	CUSNUM	CDTLMT	CHGCOD	CDTDUE			
2	3987.5	Johnson	J A	3 Alpine W	Helen	GA	30545	938485	9999	2	33.5			
3	500	Abraham	M T	392 Mill St	Isle	MN	56342	583990	9999	3	0			
4	489.5	Lee	F L	5963 Oak	Hector	NY	14841	192837	700	2	0.5			
5	439	Vine	S S	PO Box 79	Broton	VT	5046	392859	700	1	0			
6	250	Doe	J W	59 Archer	Sutter	CA	95685	475938	700	2	100			
7	100	Jones	B D	21B NW 1	Clay	NY	13041	839283	400	1	0			
8	58.75	Stevens	K L	208 Snow	Denver	CO	80226	389572	400	1	1.5			
9	37	Henning	G K	4859 Elm	Dallas	TX	75217	938472	5000	3	0			
10	25	Williams	E D	485 SE 2	Dallas	TX	75218	593029	200	1	0			
11	10	Alison	J S	787 Lake	Isle	MN	56342	846283	5000	3	0			
12														
13														

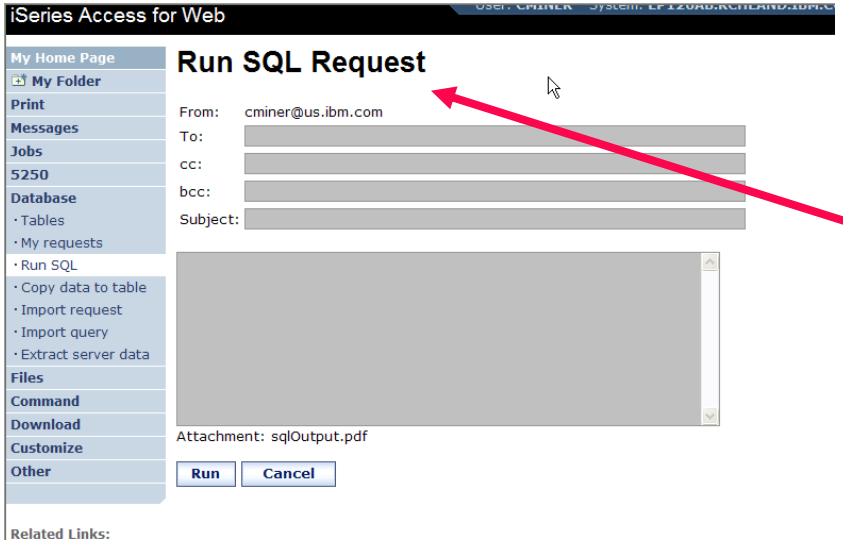
Browser sees the .xls format type and automatically starts Excel on the desktop, and puts results in a spreadsheet

Run SQL – Destination EMAIL

The SQL statement is built indicating that:

- **Output Type is PDF**
- **Destination is EMAIL**





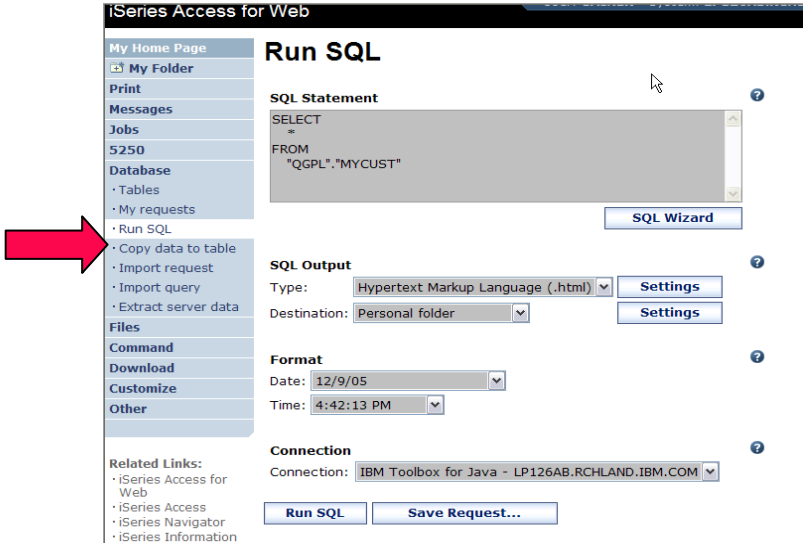
Access for Web converts SQL output to .PDF and attaches it to an email.

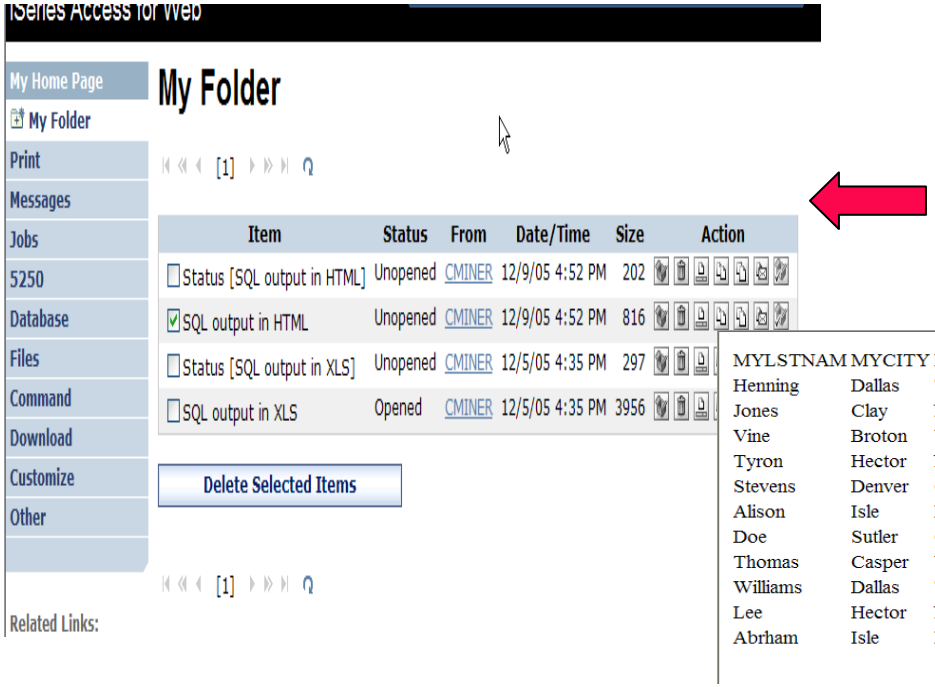
Note: my email address has been filled in for me

Run SQL – My Personal Folder

The SQL statement is built indicating that:

- **Output Type is HTML**
- **Destination is My Folder**





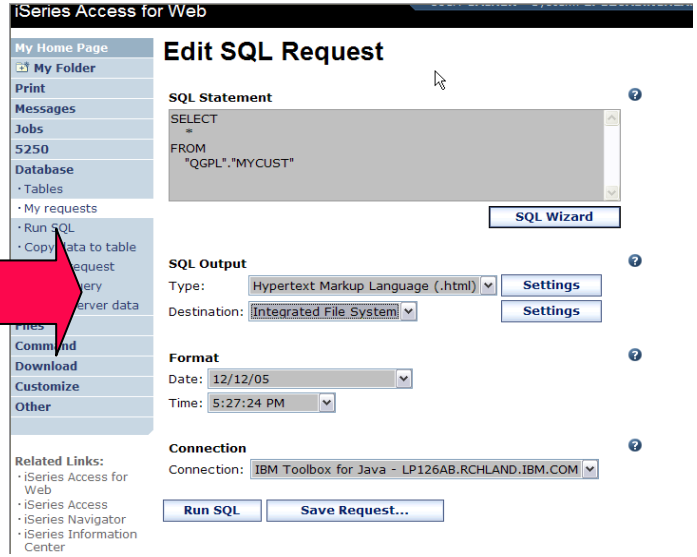
MYLSTNAM	MYCITY	MYSTATE
Henning	Dallas	TX
Jones	Clay	NY
Vine	Broton	VT
Tyron	Hector	NY
Stevens	Denver	CO
Alison	Isle	MN
Doe	Sutler	CA
Thomas	Casper	WY
Williams	Dallas	TX
Lee	Hector	NY
Abrham	Isle	MN

- **Click on My Folder link**
- **Select the SQL Output**
- **Shown to me in HTML**

Run SQL – Integrated File System

The SQL statement is built indicating that:

1. **Output Type is HTML**
2. **Destination is Integrated File System**
3. **Next screen select 'CMINER' directory**



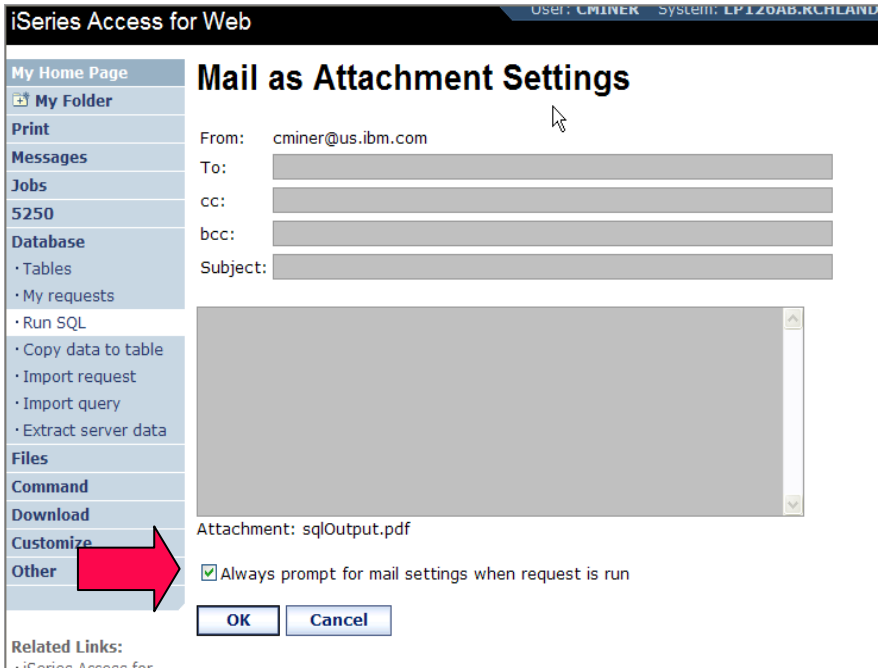
4. **Click on 'Files' tab**
5. **Open CMINER directory**
6. **Click on File Name**
7. **Results shown in HTML**

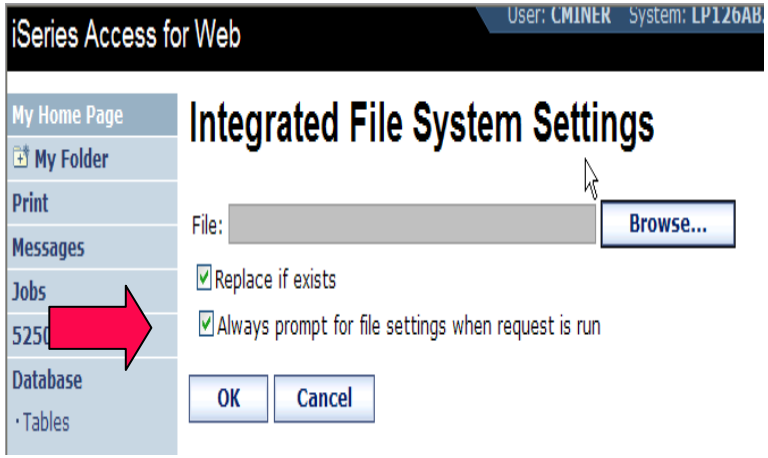
MYLSTNAM	MYCITY	MYSTATE
Henning	Dallas	TX
Jones	Clay	NY
Vine	Broton	VT
Tyron	Hector	NY
Stevens	Denver	CO
Alison	Isle	MN
Doe	Sutler	CA
Thomas	Casper	WY
Williams	Dallas	TX
Lee	Hector	NY
Abrham	Isle	MN

Destination Settings

You can specify the folder and mail settings before the request is run

Or you can wait until the request is run





Shortcuts

Give users access to upload/download requests you have created

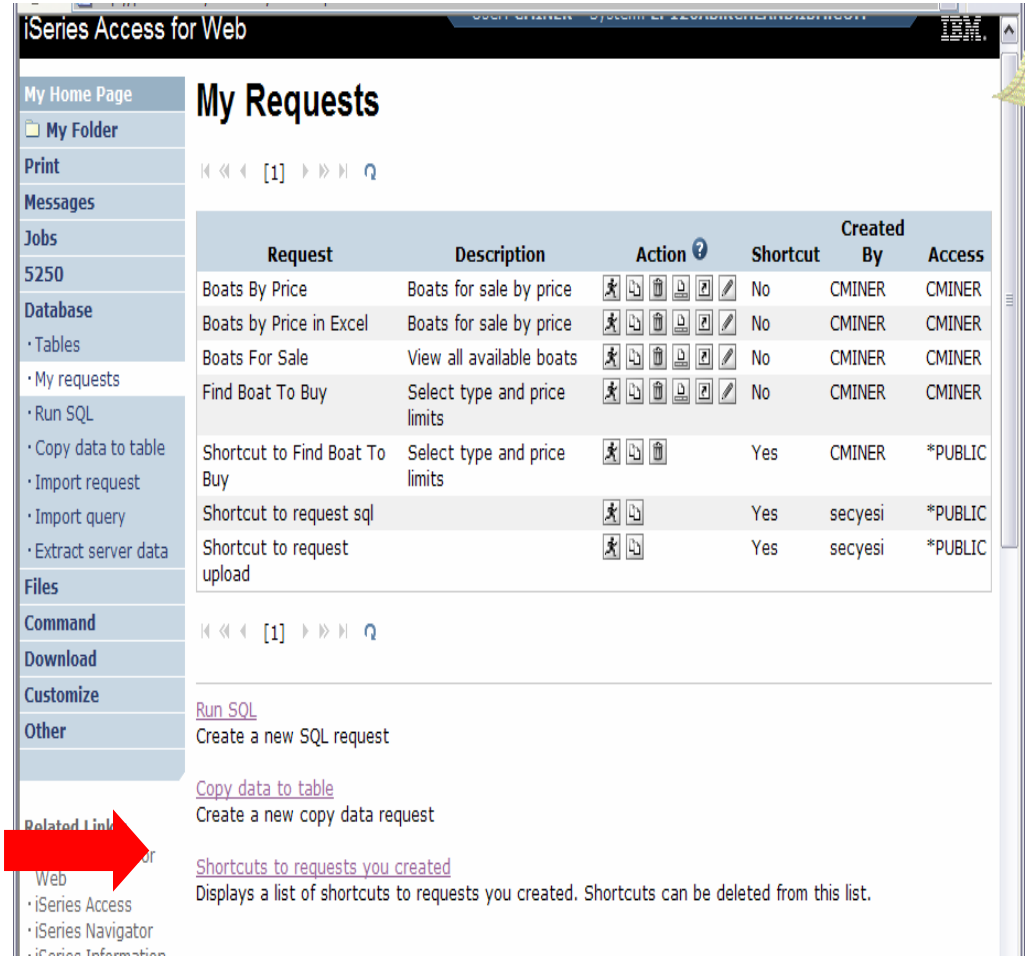
Shortcuts – working with, managing

Under "Action" column, you can:

- **Create shortcuts to existing requests**

At bottom of screen, you can:

- **List shortcuts you have created**
- **Delete shortcuts from the list**



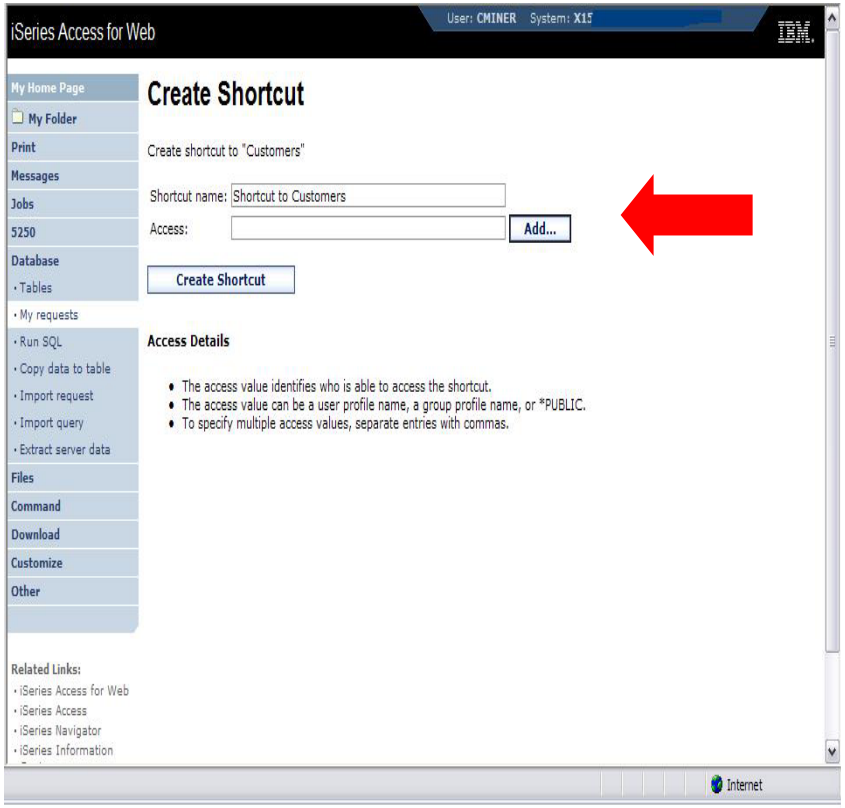
Shortcuts – giving users access

Under “Actions” select Create Shortcuts.

Click browse button to see all users and groups on the system.

- **Add the users and groups you want to run this saved request**

If the Predefined Request changes, the Shortcut is automatically changed for users too



Set Policies for Building Requests / Using Shortcuts

Policies work on i5/OS User Profiles – Users and Groups

Decide what users can do with your shortcuts

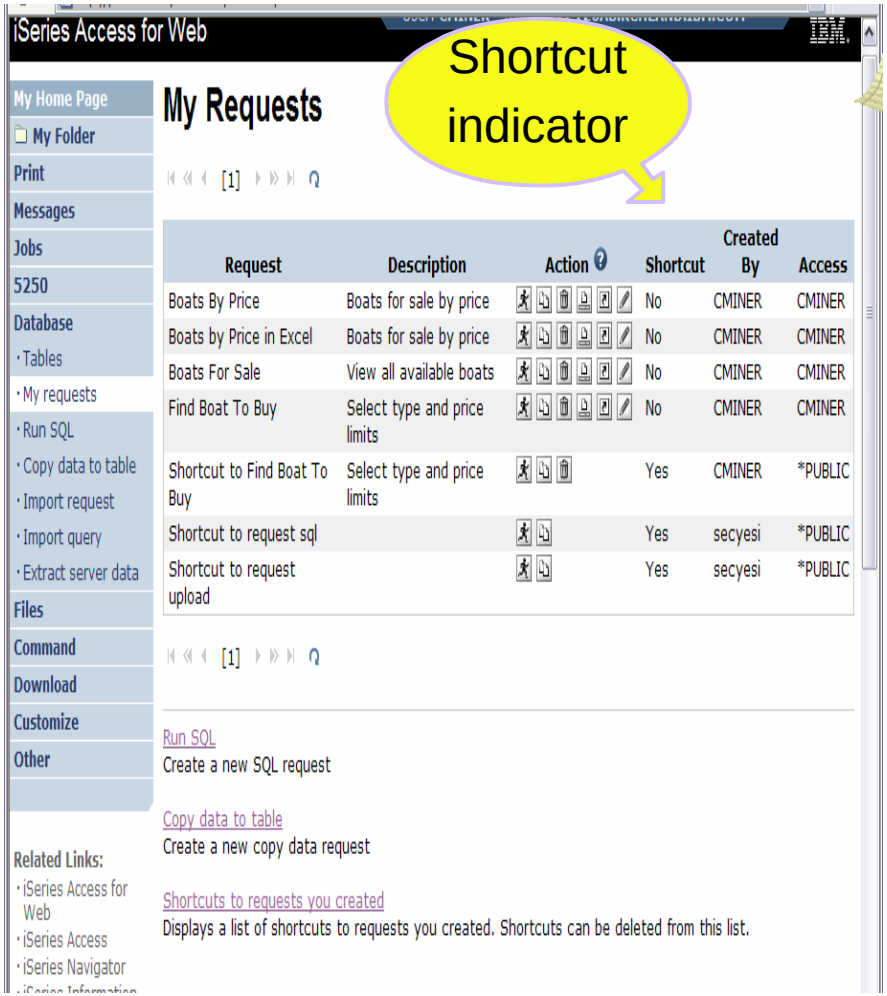
- **Copy them**
- **Delete them**

Set up Policies to:

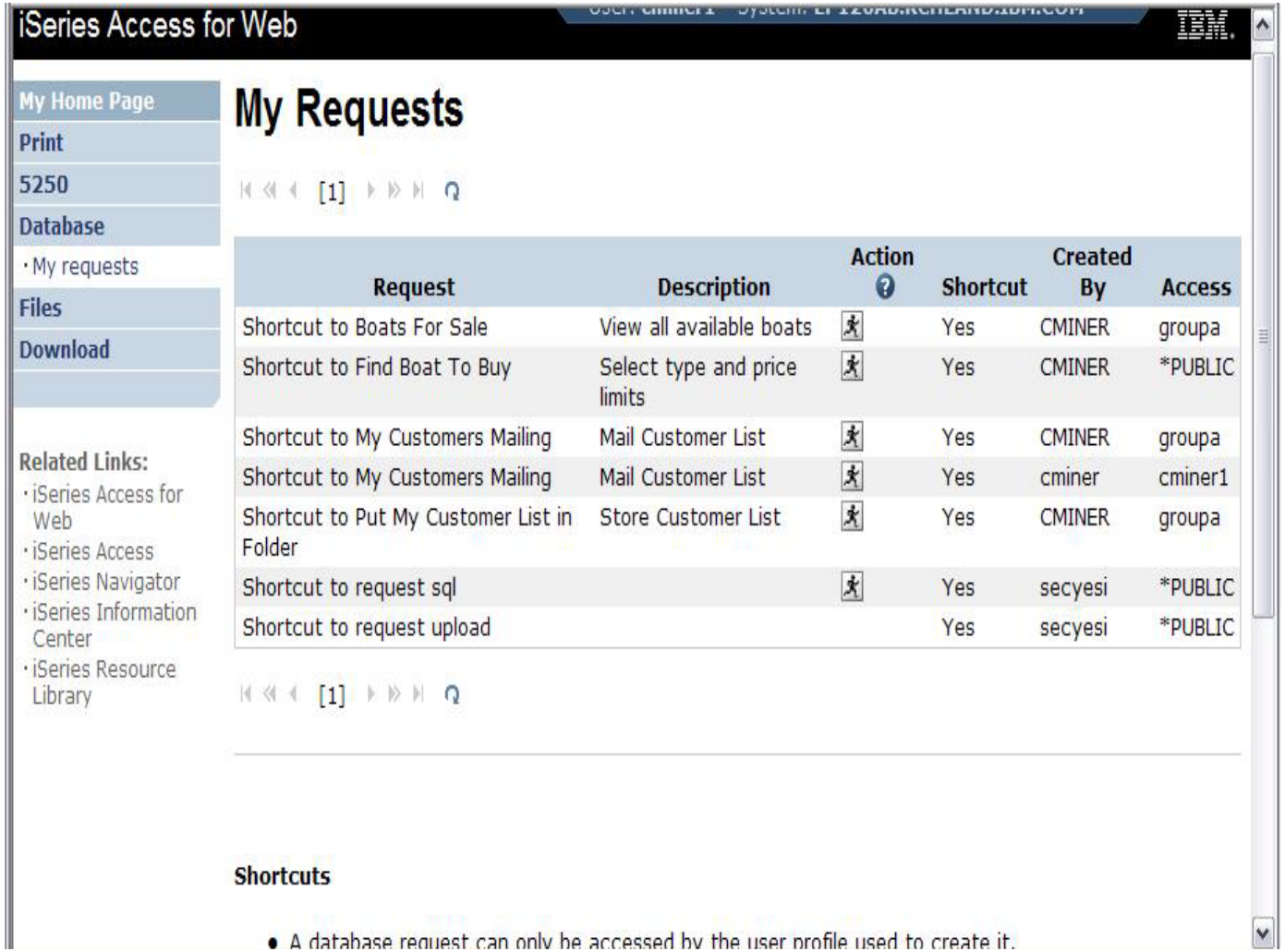
- **Allow users to create and modify requests**

or

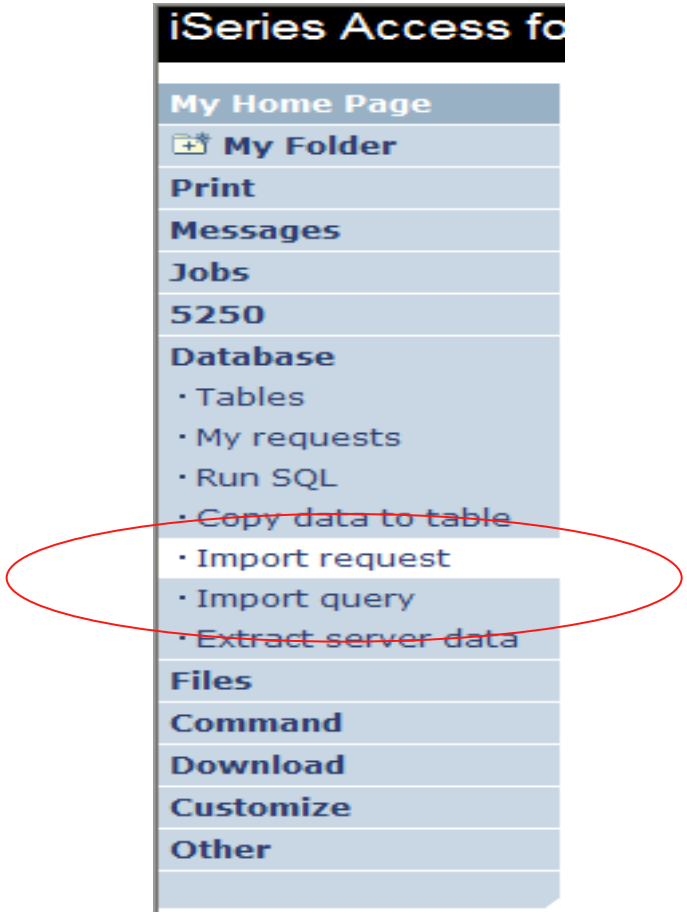
- **Run only previously defined shortcuts**



User can only run shortcuts previous built by someone else

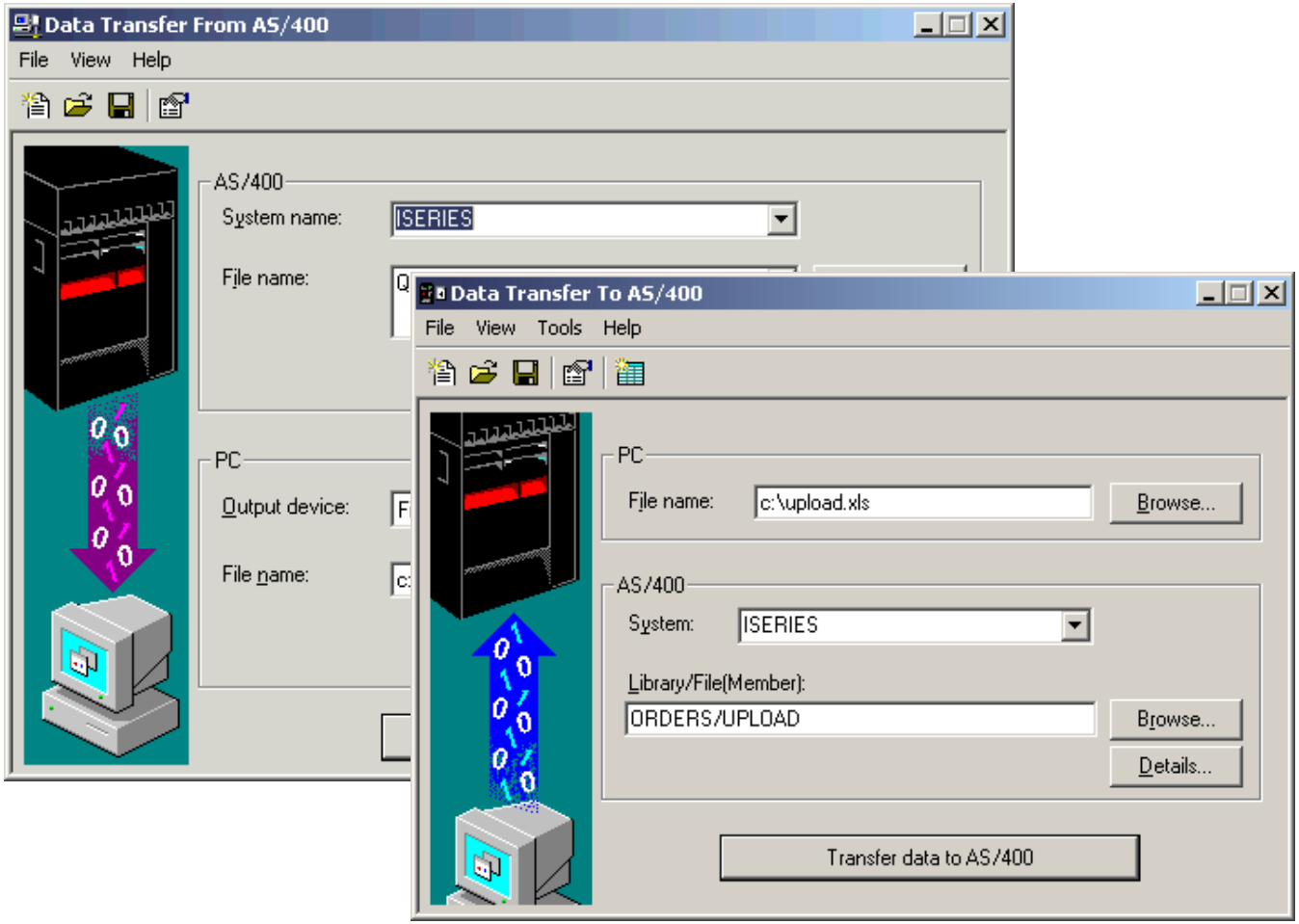


Import Requests and Import Queries



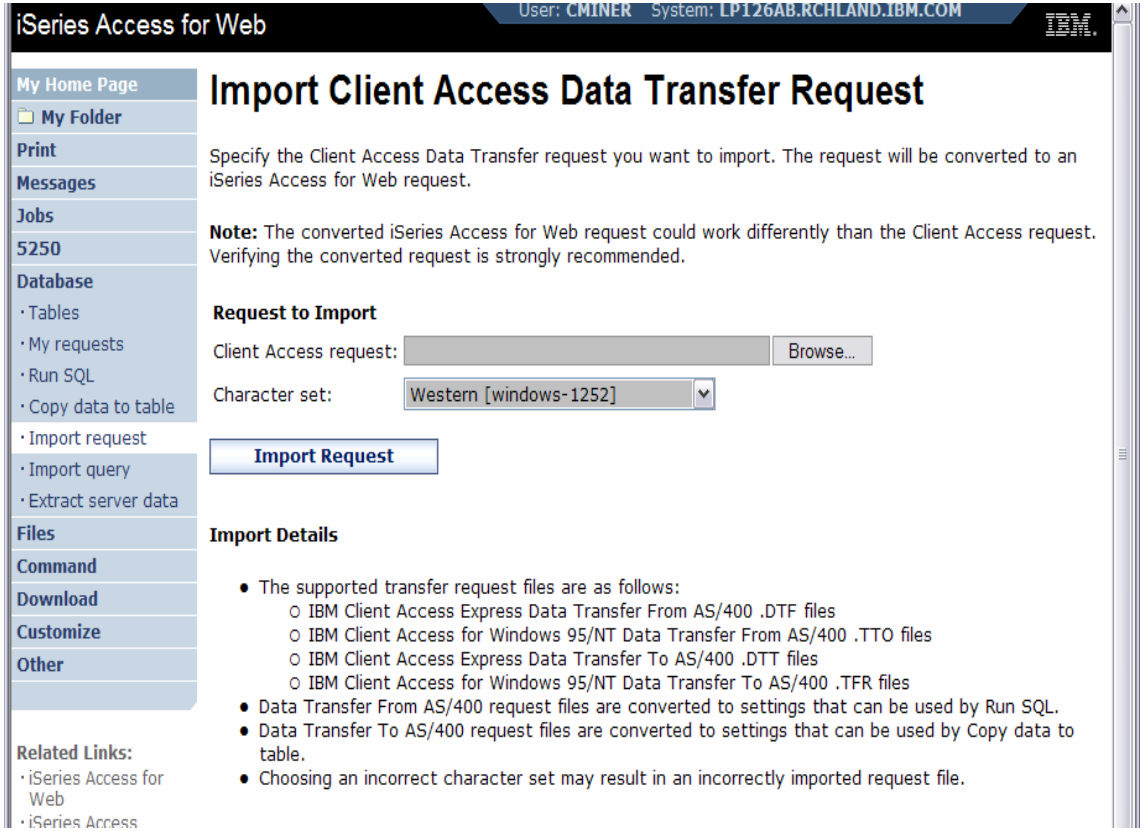
Importing Client Access Data Transfer Requests

Import your existing iSeries Access for Windows and Client Access Data Transfer requests into iSeries Access for Web!



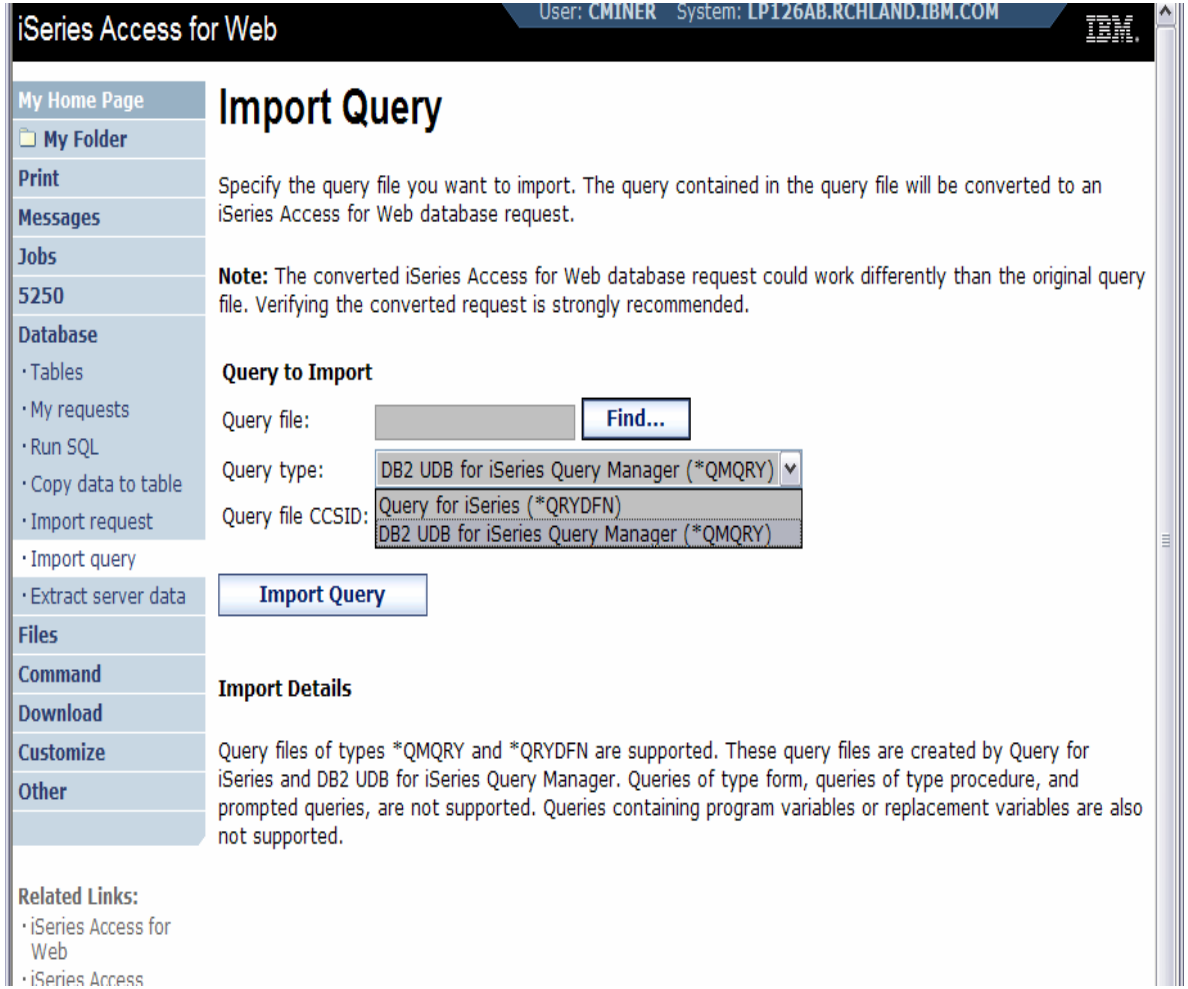
Import Function

- Don't lose your investment in already built Data Transfer requests
- Import them into iSeries Access for Web
- The imported transfer request may be run or saved as an iSeries Access for Web request
- Then users can run them from their browsers!



Import Query Requests

- **Bring your existing queries to a browser environment**
- **Use the Import Query tool to bring them into iSeries Access for Web**
  - **IBM Query for iSeries (5722-QU1)**
  - **DB2 Query Manager (5722-XT1)**

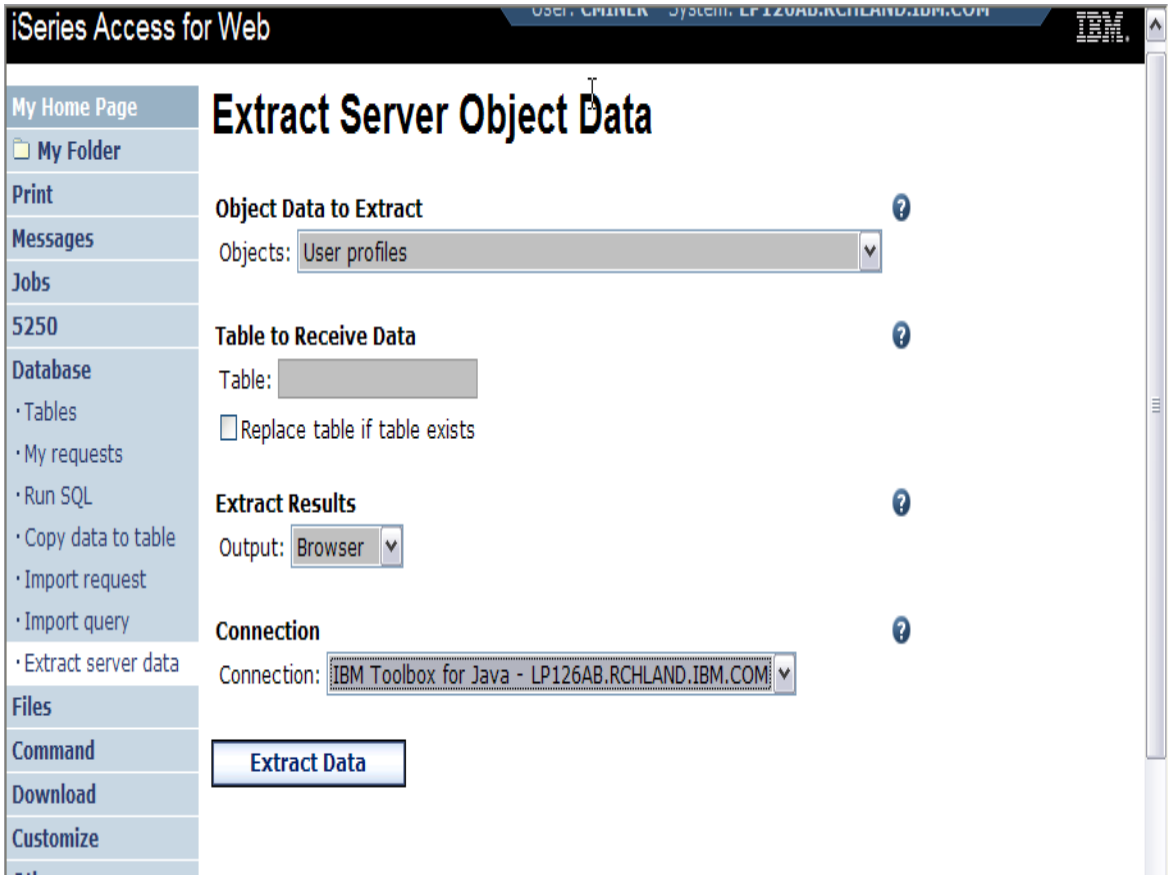


QMQRY and *QRYDFN are the query file types supported

Extract Server Data

Extract Server Data

- **Extract i5/OS object information into a database table or tables.**
- **Then use Tables or Run SQL functions to retrieve relevant data.**



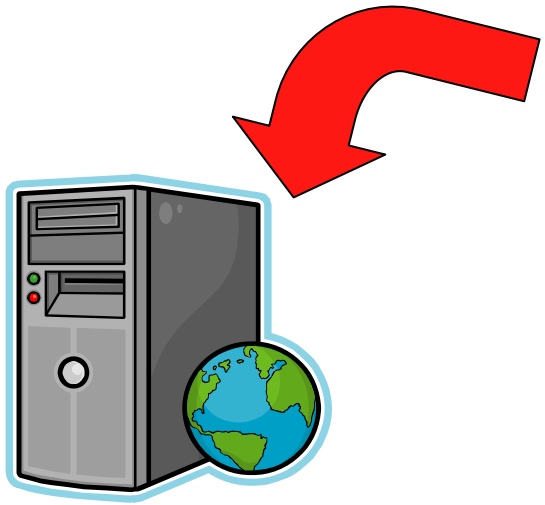
Extract Server Data

Extract Server Data can be used to retrieve information about i5/OS objects and store the results in a database table

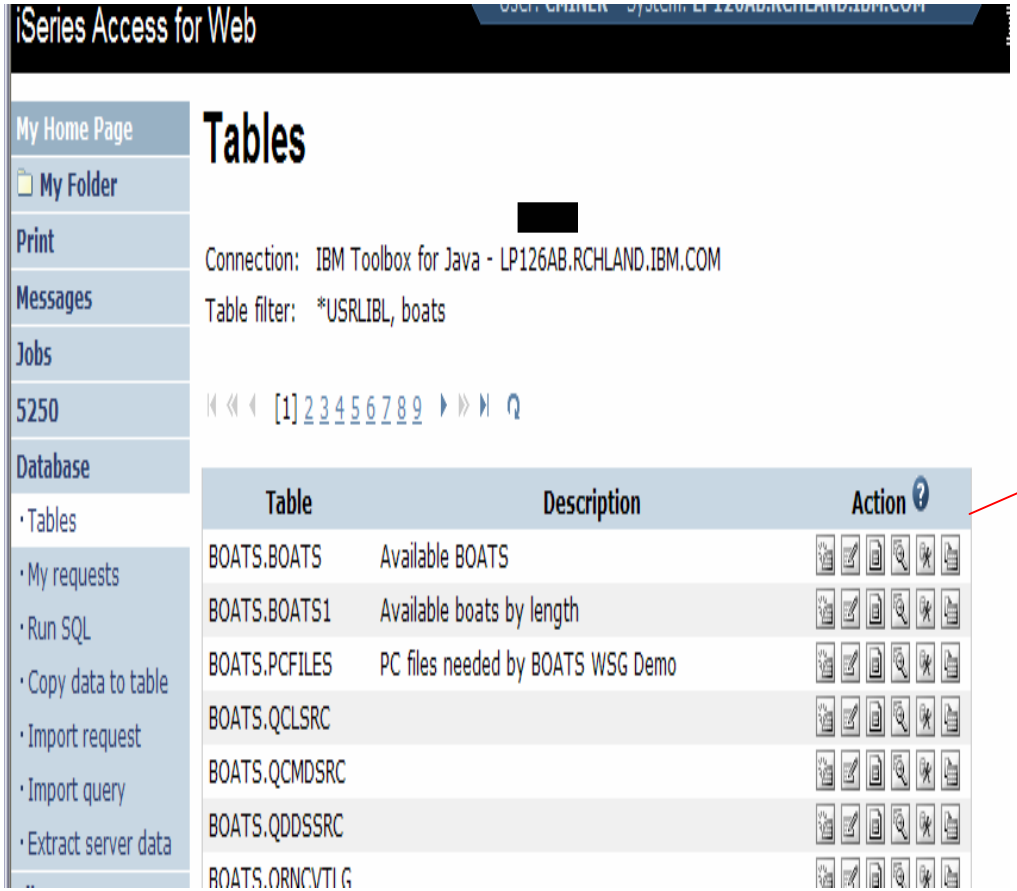
- **General object information can be retrieved for any i5/OS object type.**
- **Object specific information can also be retrieved for the following object types:**
  - Directory entries
  - Messages
  - Software fixes
  - Software products
  - System pool
  - User profiles

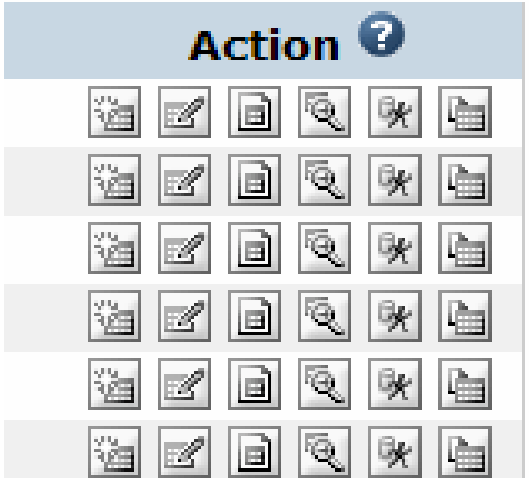
- **You could easily build a query:**
  - **To find out what users have used more than 100 MB of storage**
  - **Or you might want to know what users have had more than 2 invalid sign-on attempts in the past three months.**
- **This very powerful capability lets you look at your i5/OS object information in any manner that is of importance to you.**

GUI to work directly with DB2 for i5/OS Table data



Tables – work with i5/OS database information





- **Insert**
- **Update**
- **Quick View**
- **Find**
- **Run SQL**
- **Copy Data To Table**

Working with Tables

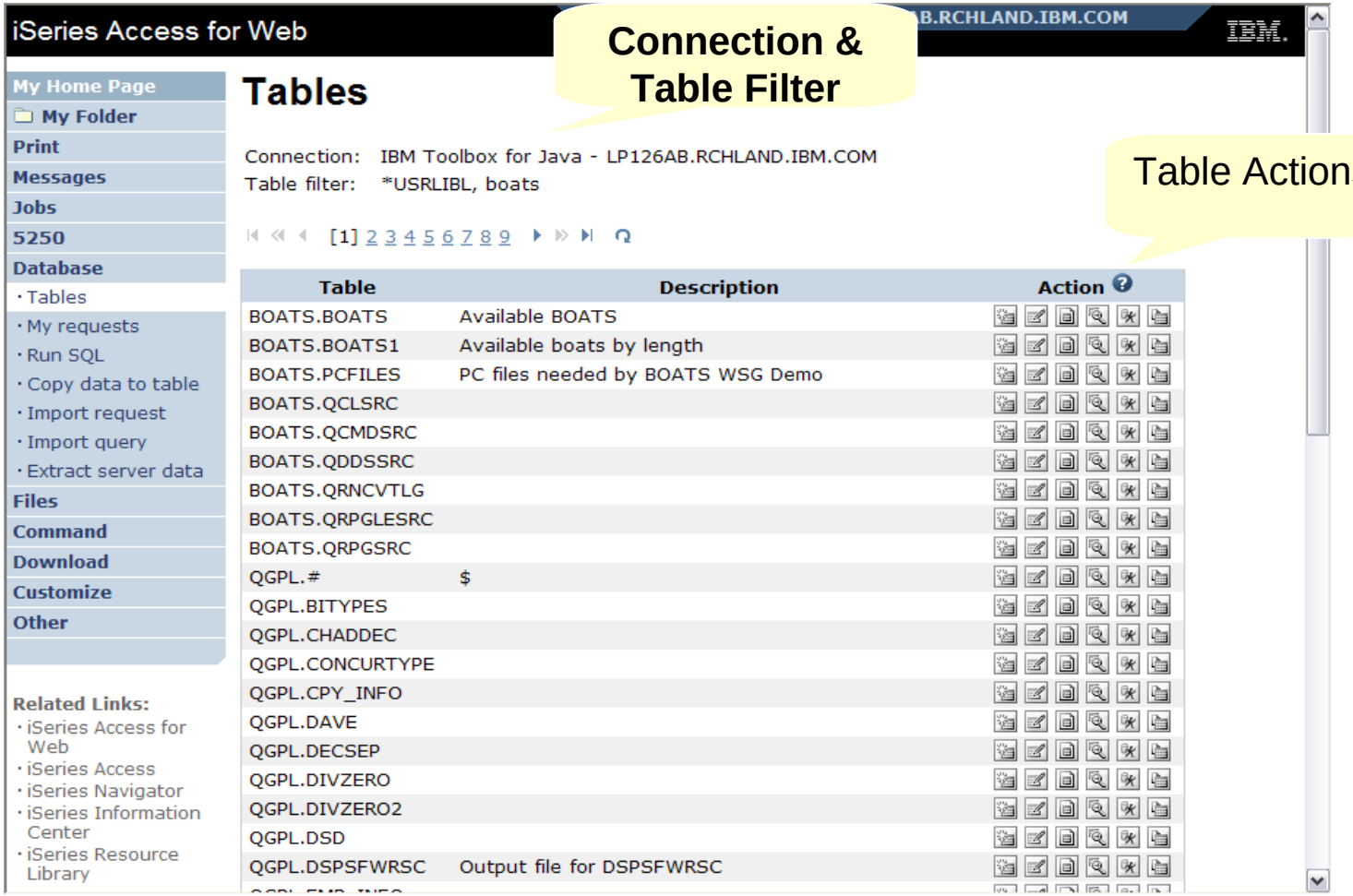


Table Filter

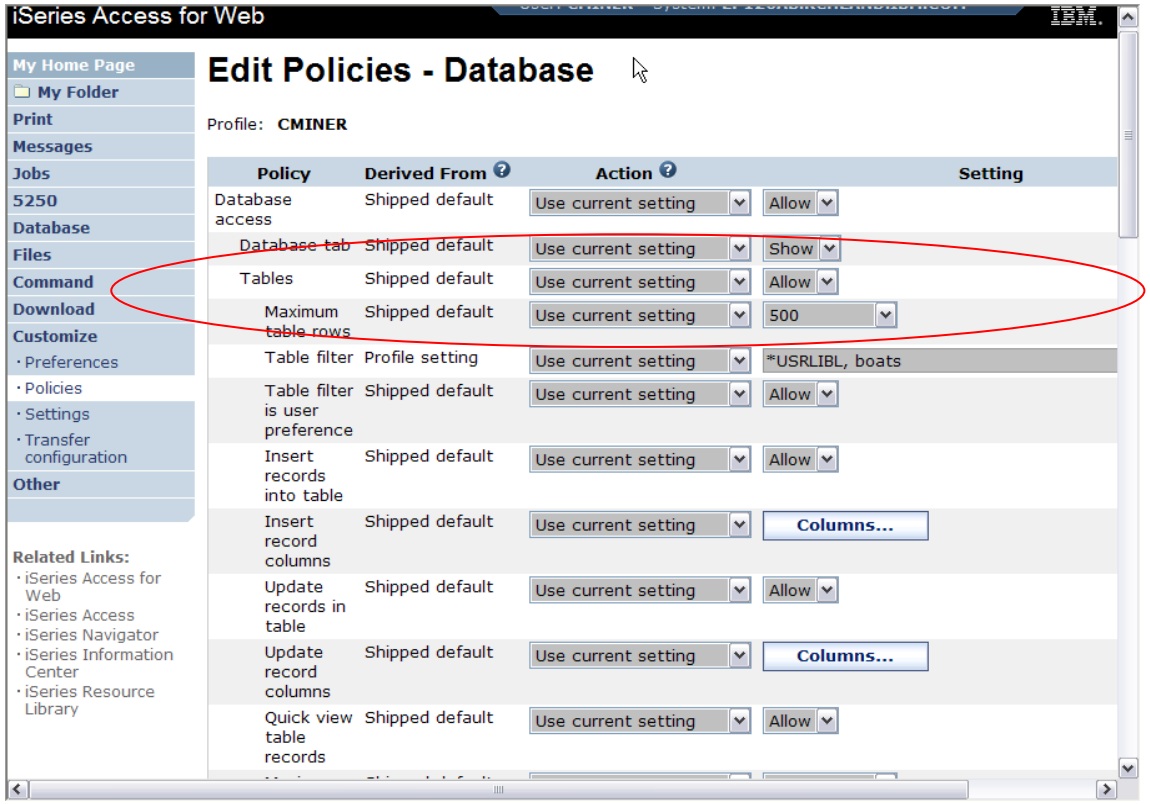
Used to control the tables displayed in the Tables list

Comma-separated list of

- **schemas**
- **schema filters**
- **tables**
- **table filters**

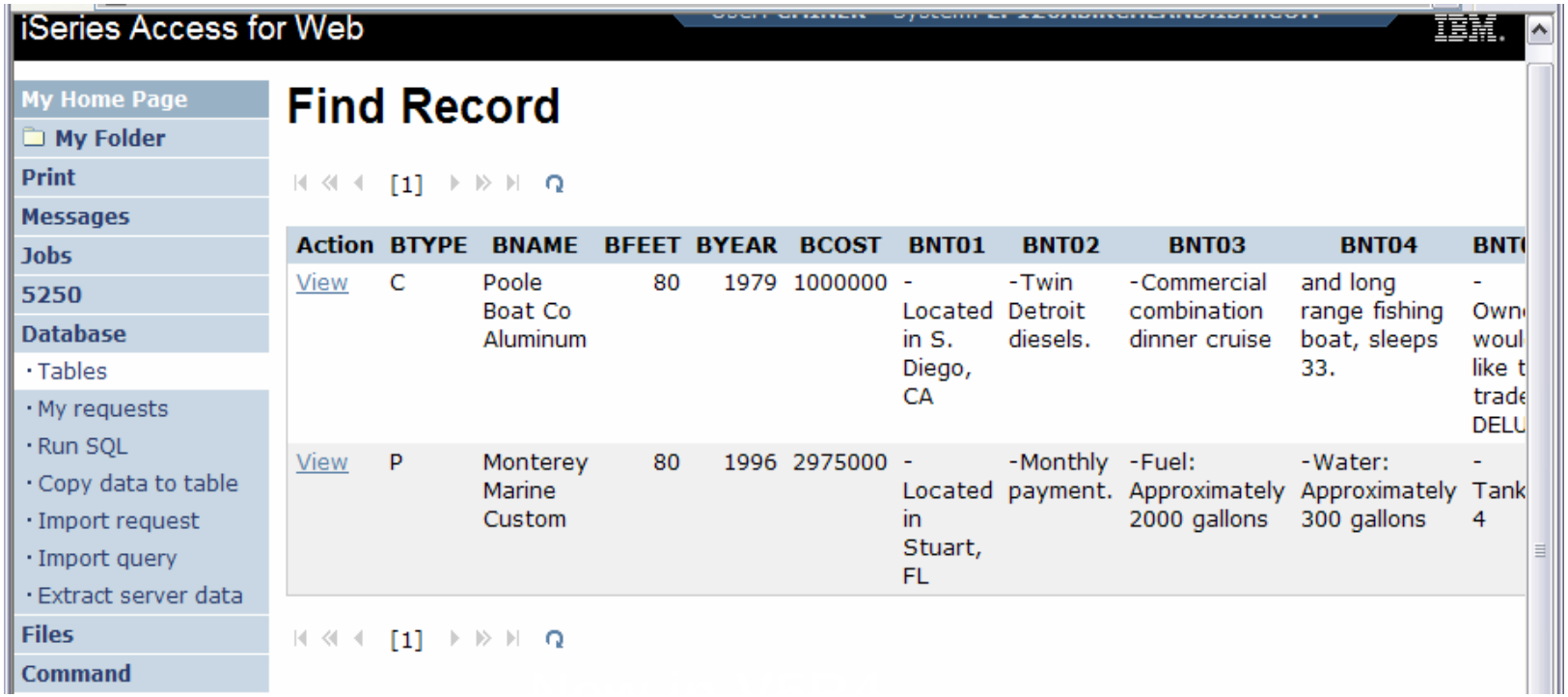
The % character is used as a wild card character.

***USRLIBL is a special value to identify all tables in the user portion of the library list.**



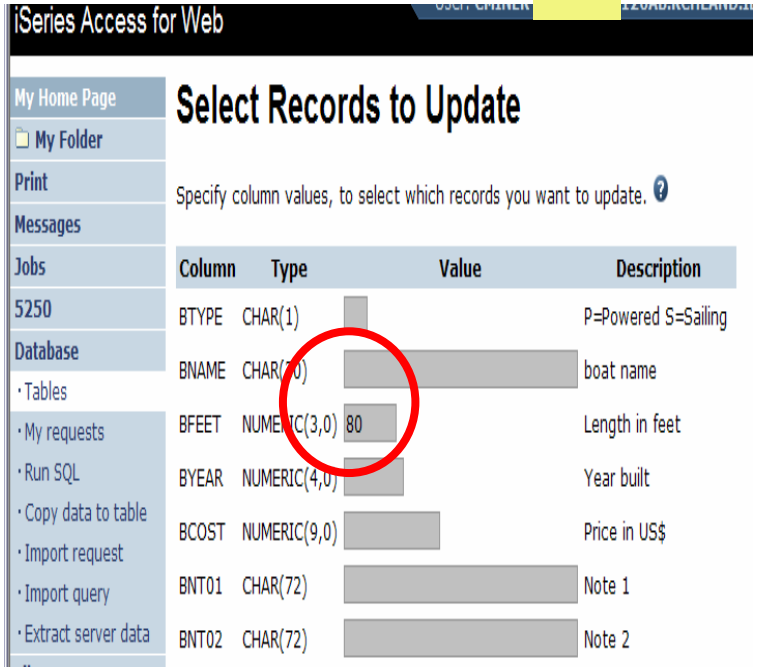
Tables → Find Record

- If you don't want users 'updating', 'inserting' or 'deleting' records,
- then let them use only the Find function

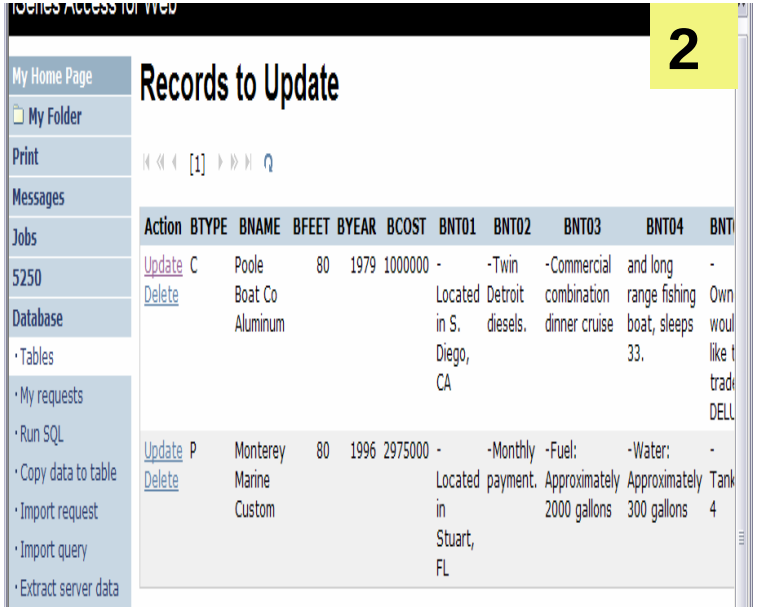


Tables → Update Function

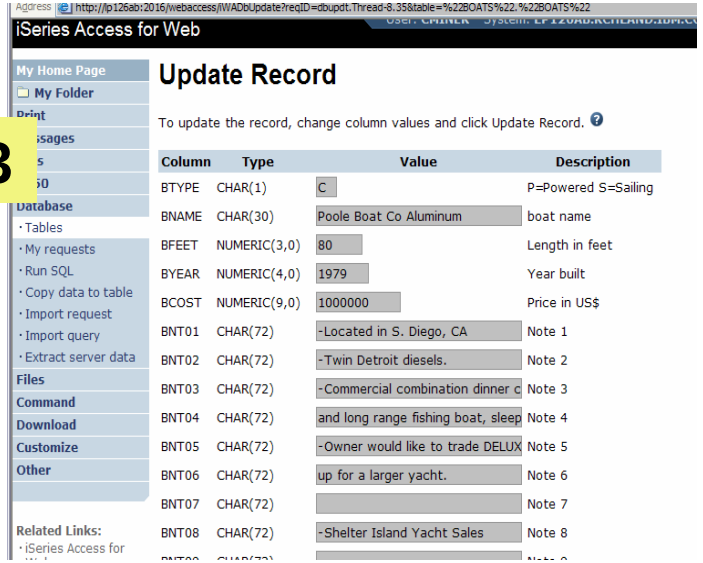
1



2

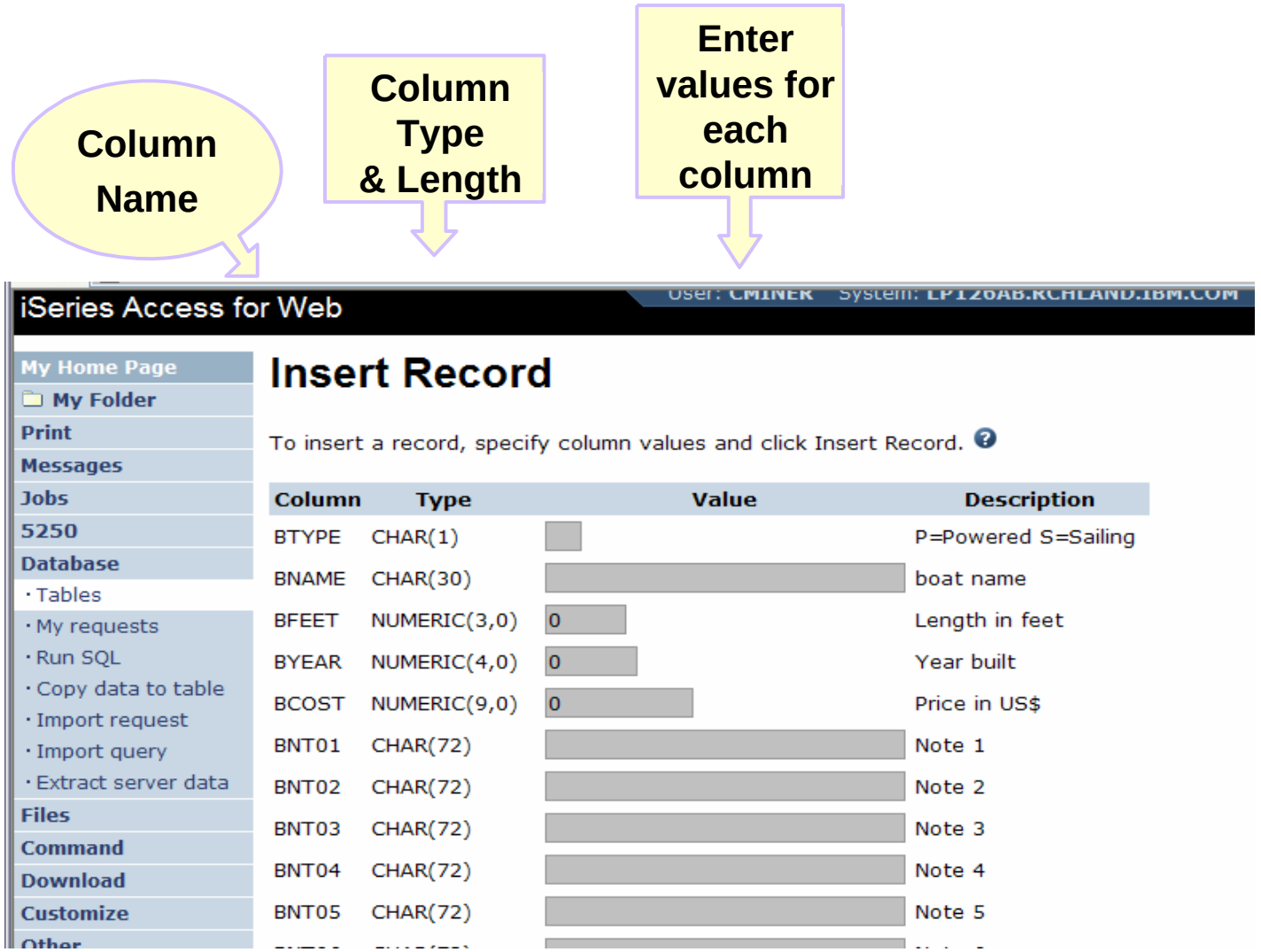


3



Wildcards may be used in the selection

Inserting New Records into A Table



Appendix A. HTML Output Types

Use HTML File support
Updating a Web server

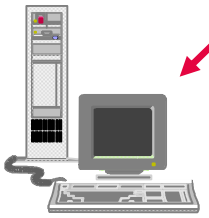
Download Database information to Workstation

1

HTML File Generated at PC

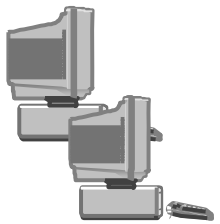
2

Send HTML output to Web Server File System



3

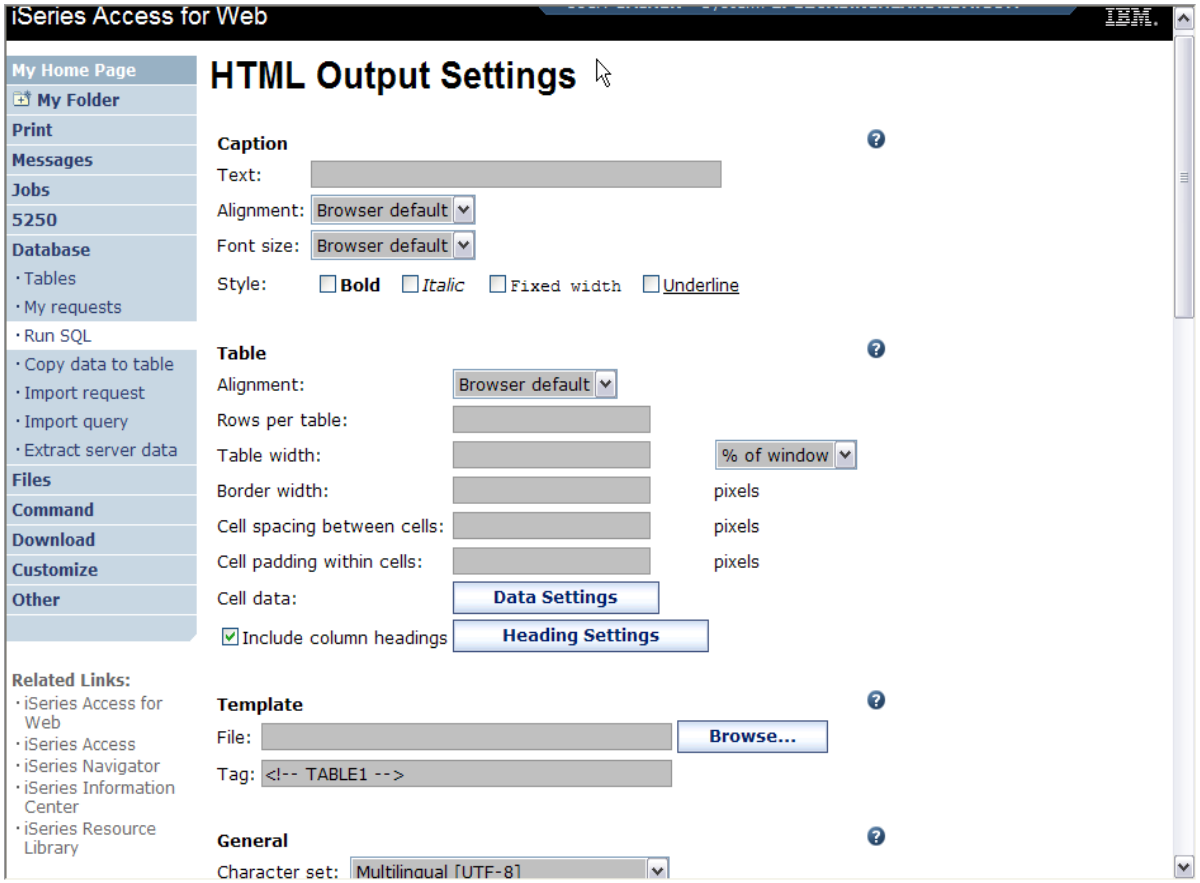
Client browsers view HTML on iSeries or PC Web Server



Client PC

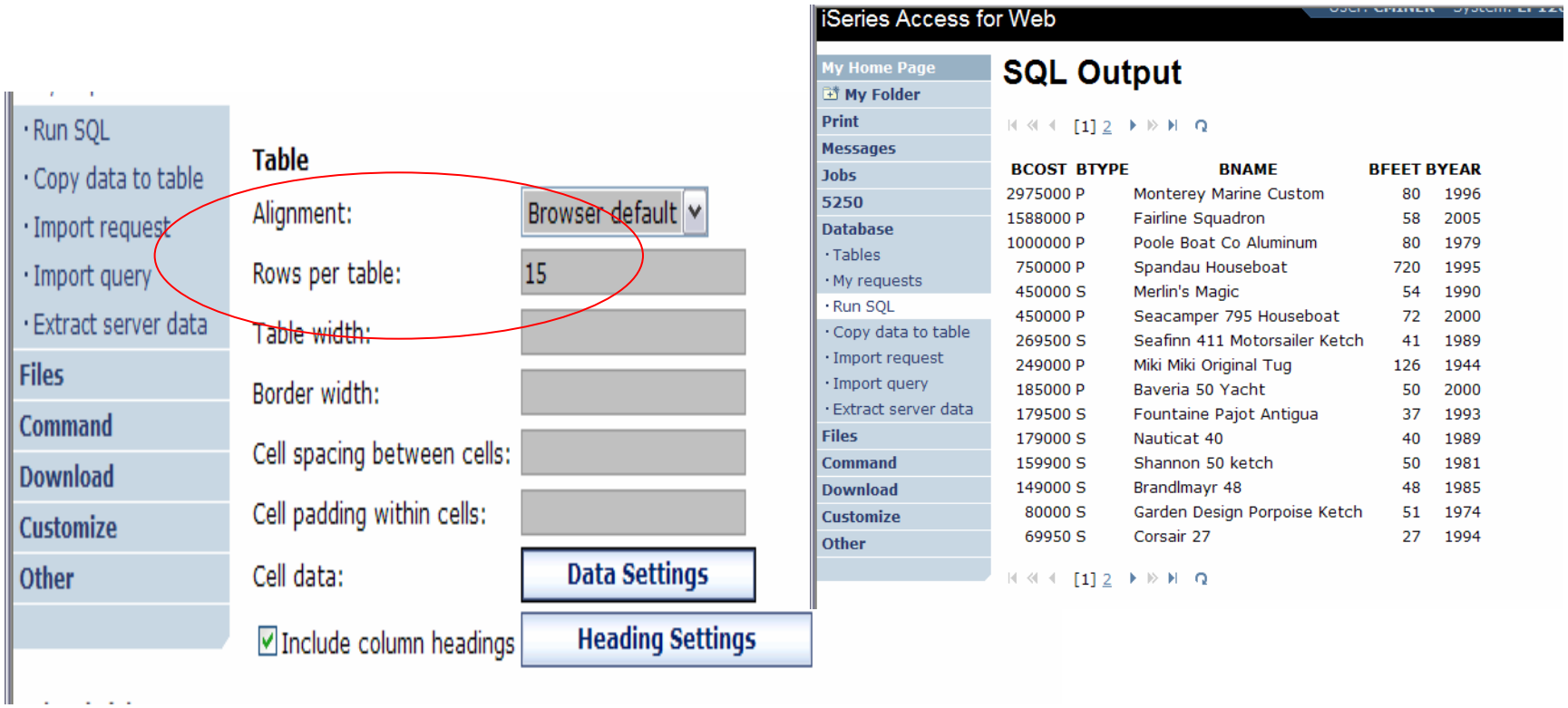
HTML Output Settings

- **Many settings from:**
- **Caption**
- **Table**
- **Cell data**



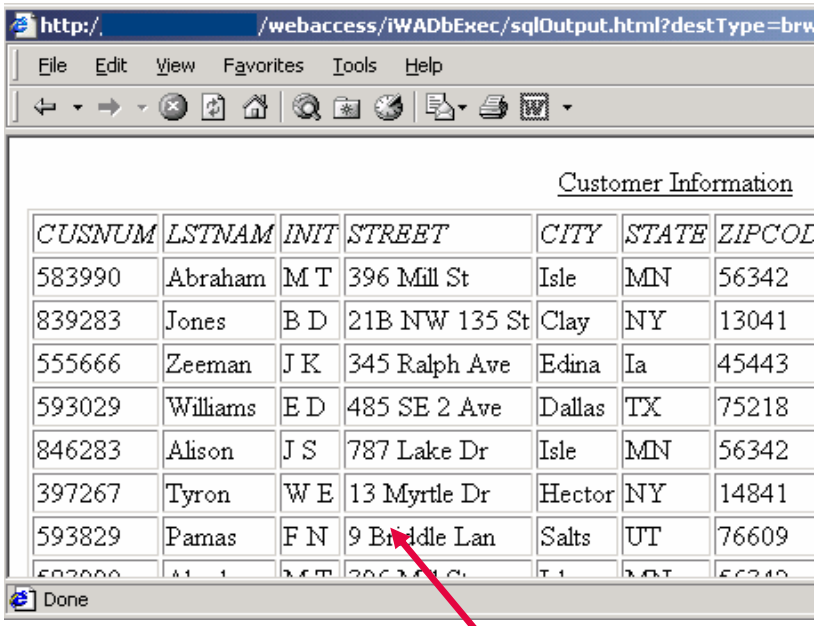
Displaying output in a paged list

iSeries Access for Web (continued)



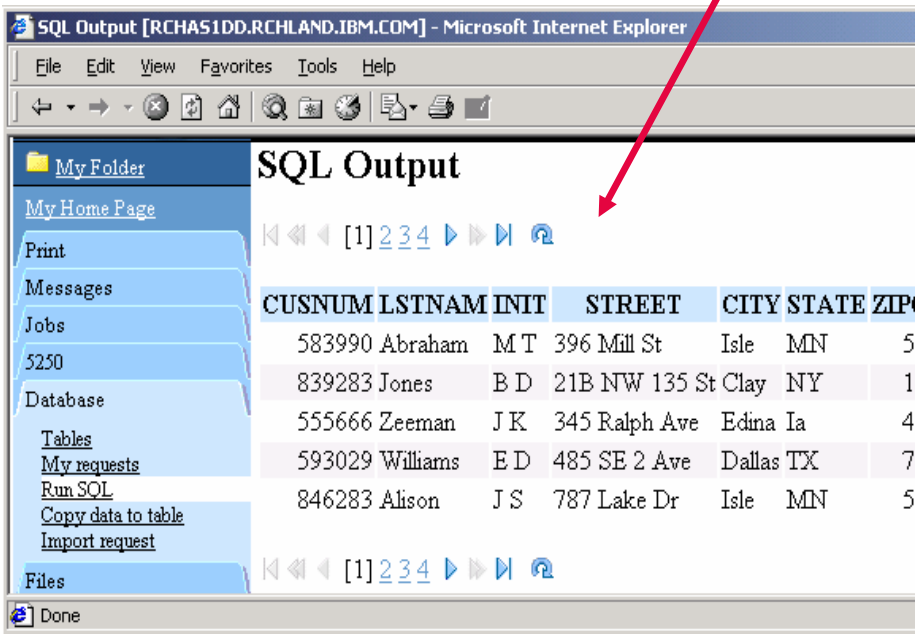
- **Specify a value for 'Rows per table' to limit the number of rows displayed on a page**

Contrasting other layouts



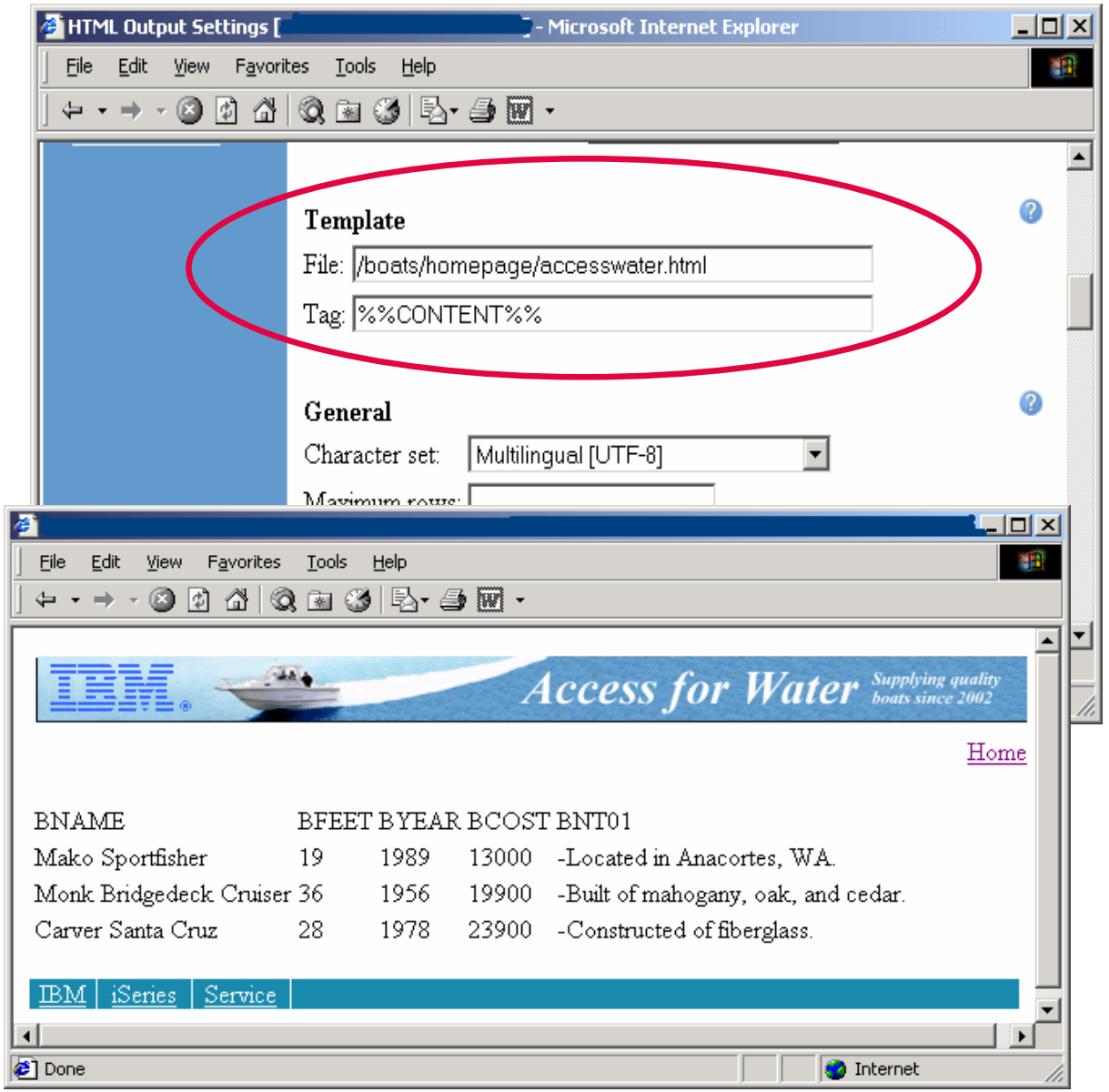
If you do not specify a value for 'Rows per table', all results are returned in a single page

Preview output type displays a limited number of rows per page, but you can't customize how the list is displayed



A template file can be used to display custom content before and after the statement results

The template file must have previously been placed in the Integrated File System (IFS) on the iSeries server



iSeries Access for Web **(continued)**

Example of template file

```
<HTML>
<BODY>
<table>
<tr><td>
<img SRC="boathead.gif" height=43 width=614>
</td>
  <tr>
    <td align="right">
       <a href="/webaccess/iWAHome">Home</a>
    </td>
  </tr>
</table>
<br>
%%CONTENT%%
<br>
<BODY>
</HTML>
```

Appendix B: Comparisons: Similarities / Differences

- iSeries Access for Web
- iSeries Access for Windows

Supported File Formats

Supported file formats	System i Access for Web Database (servlets)	System i Access for Windows Data Transfer
• Comma Separated Variable	Yes	Yes
• Data Interchange Format	Yes	Yes
• Extensible Markup Language (XML)	Yes	Yes
• Hyper Text Markup Language (HTML) (on downloads)	Yes	Yes
• No conversion		
• ASCII Text	No	Yes
• Text – Tab delimited	Yes	Yes
• Basic Random	Yes	Yes
• Basic Sequential	No	Yes
• DOS Random	No	Yes
• DOS Random Type 2	No	Yes
	No	Yes

Supported File Formats (continued)

Supported file formats	iSeries Access for Web Database (servlets)	iSeries Access for Windows Data Transfer
• Preview (on downloads)	Yes	Yes
• Portable Document Format (PDF) (on downloads)	Yes	No (can send to PC printer by selecting 'Print' as output device)
• Microsoft Excel Version 3	Yes	Yes
• Microsoft Excel Version 4	Yes	Yes
• Microsoft Excel Version 5	No	Yes
• Microsoft Excel Version 7	No	Yes
• Microsoft Excel Version 8	No	Yes
• Microsoft Excel XML	Yes	Yes
• Lotus 123	No	Yes
• Lotus 123 Version 1	Yes	No
• Lotus 123 Version 4	No	Yes
• Lotus 123 Version 9	No	Yes

Comparison of Database Capabilities

Feature / Function	iSeries Access for Windows	iSeries Access for Web	iSeries Access for Linux
ODBC driver	Yes	No	Yes
OLE DB provider	Yes	No	No
.NET provider	Yes	No	No
From an iSeries, start programs/commands on PC			
– Incoming Remote Command	Yes	No	No
GUI to find, add, update, delete selected records in an iSeries database Table	No	Yes	No
GUI to convert query results to .PDF format	No	Yes	No
GUI to e-mail query results in one step	No	Yes	No
Wizard to import Query/400 SQL requests	No	Yes	No
Wizard to import Query Manager SQL requests	No	Yes	No
Wizard to import iSeries Access for Windows Data Transfer requests	No	Yes	No
Programming Support			
– ActiveX automation Objects	Yes	No	No
– Limited support using java.net.URL and the documented URL Interfaces	No	Yes	No

Comparison of Data Transfer and Access for Web Database

Feature / Function	iSeries Access for Windows	iSeries Access for Web
• All SQL Statements Supported	Yes	Yes
• Wizards to build SELECT statements and convert to PC format	Yes	Yes
• Can build SELECT statements with group, having, and join support	Yes	No
• Can create dynamic queries (prompted for input at time of running)	No	Yes
• Access to members other than the default member	Yes	No
• Wizards to upload PC data to iSeries DB2	Yes	Yes
• Support for Source Physical Files	Yes (sequence and data generated on uploads is not returned by default)	No (treated the same as other Table Values)
• Upload data directly from Excel	Yes	No
• Excel dates/times handled as dates/times	Yes	No, handled as character strings
• Can run predefined saved requests	Yes	Yes
• Schedule requests to run silently	Yes	No
• Can Share requests amongst users	No, put on shared drive	Yes, via Shortcuts
• Can run multiple requests simultaneously (batch)	Yes (RTOPCB, RFROMPCB)	No
• Asynchronous Processing (ie, control returned before request completes)	No	Yes (except for Browser option)

Request Types

iSeries Access for Web	iSeries Access for Windows
Database Requests From iSeries 1. Requests are saved by User name, extension types are not displayed 2. An “Import” Facility (*) can be used to convert iSeries Access for Windows Data Transfer requests to iSeries Access for Web requests	**Data Transfer From iSeries** 1. .DTF - New request type used by iSeries Access for Windows 2. .TTO - Request type used in 5763-XD1 and DOS Extended clients 3. .DT - Request type used in Windows 3.1 client 4. .RTO - Rumba transfer request file
Database Requests To iSeries 1. Requests are saved by User name, extension types are not displayed 2. An “Import” Facility (*) can be used to convert iSeries Access for Windows Data Transfer requests to iSeries Access for Web requests	**Data Transfer To iSeries** 1. .DTT - New request type used in iSeries Access for Windows 2. .TFR - Request type used in 5763-XD1 and DOS Extended clients 3. .DT - Request type used in Windows 3.1 client 4. .RTO - Rumba transfer request file

(*) RTO files are not supported by Import Facility in iSeries Access for Web

Microsoft Excel Support

What is significance of various Microsoft Excel formats supported?

1. **Microsoft Excel XML - is the newest type supported by Excel and Word, and it is a defined format that is easy to parse programmatically.**
2. **For iSeries Access for Web, the Microsoft Excel XML file type is the only "native" Excel file type that is supported for working with very large amounts of rows.**
3. **iSeries Access for Windows enables you to work with large amounts of rows using BIFF5, BIFF7, BIFF8 file types.**

Supported file formats	iSeries Access for Web Database (servlets)	iSeries Access for Windows Data Transfer
• Microsoft Excel Version 3	Yes	Yes
• Microsoft Excel Version 4	Yes	Yes
• Microsoft Excel Version 5	No	Yes
• Microsoft Excel Version 7	No	Yes
• Microsoft Excel Version 8	No	Yes
• Microsoft Excel XML	Yes	Yes

Overall Strengths – database function

iSeries Access for Windows Data Transfer

- Runs natively on Windows; can also run on a Windows web server
- Provides an SQL-like interface to allow full file SELECT or customized queries including joins, sorting, and record grouping. Can run advanced queries.
- Transfer source physical files and data physical files to PC file types
- Transfer PC file types to the source and data physical files on System i.
- Transfers may be run interactively, in batch mode, and programmatically
- Can run requests by clicking an icon
- Can schedule data transfers
- Has Excel Add-ins
- Has ActiveX Automation Objects

iSeries Access for Web Database:

- Runs on System i web server; sends HTML to browser
- You can work directly with Tables, including Find, Insert, Updating, Delete, and Add. You may also view the entire table.
- Can run any SQL statement
- Supports both Dynamic and Static queries
- SQL Wizard helps you build SELECT statements.
- Can email results in many data formats
- Can convert results to PDF
- Can create Requests and give to other users to run
- Can Import Client Access Data Transfer requests; and IBM Query for iSeries (5722-QU1) and DB2 Query Manager SQL requests.