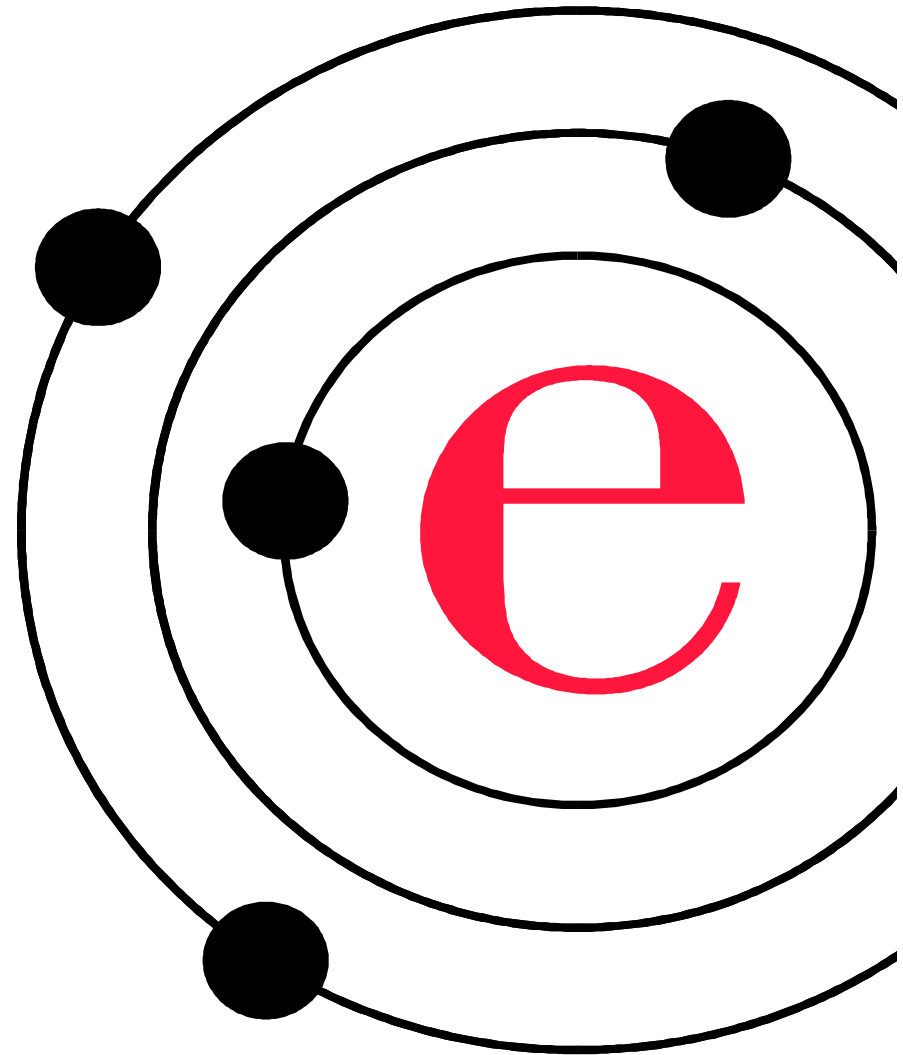


*Connect Your Data to
the Web with Net.Data*



Bill Rapp

AS/400 Division

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A decorative graphic on the left side of the slide, consisting of a vertical black bar and a red square above it.

Agenda

Where does Net.Data fit?

Static vs. Dynamic web serving

Macro walk-through

Overview & Structure

What is Net.Data for?

Language features

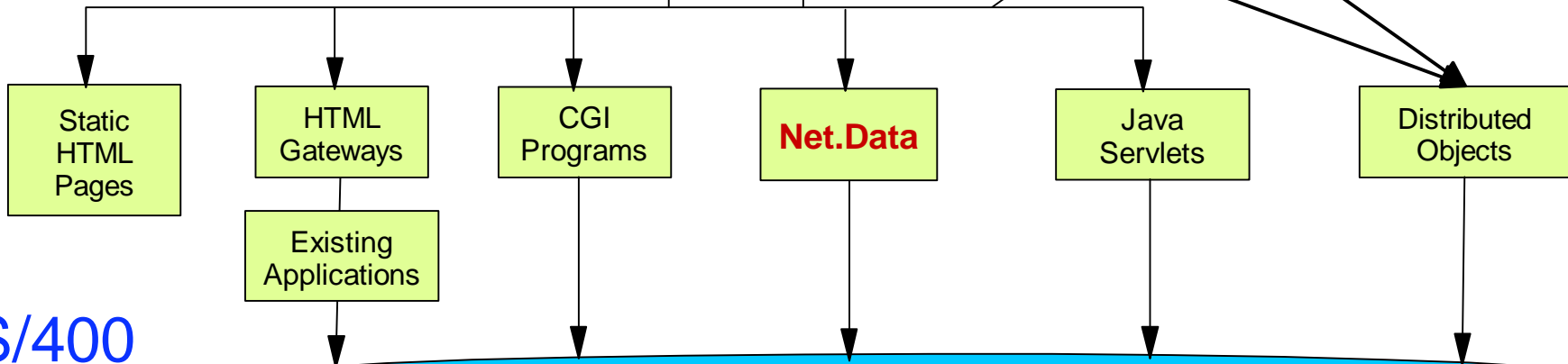
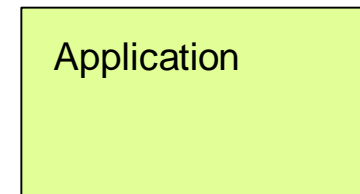
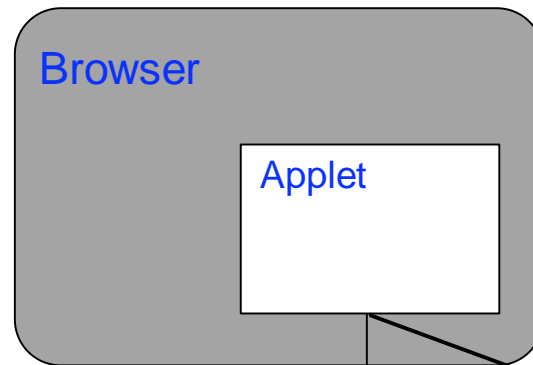
Recently added features

Where to get more information

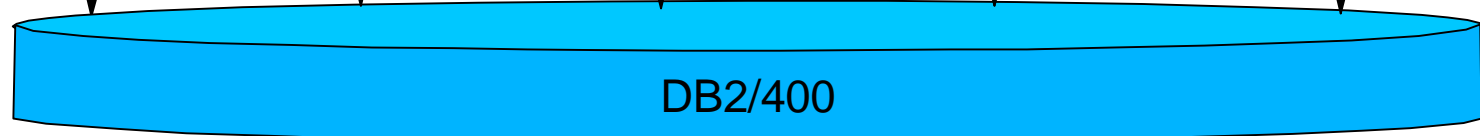
Where does Net.Data fit?

Information Serving Design Types

Web Client



AS/400 Server



DB2/400

Static vs. Web Applications

Static Pages

You create the HTML

```
<html>
<title>Page Title</title>
<body>
<p>Here is my page.

</body>
</html>
```

HTML

- Used for infrequently changing text
- All format - no logic
- "Dead": never changing



Dynamic Pages

You create a program - IT creates the HTML!

CGI Program

```
<html>
<title>Page Title</title>
<body>
<p>Here is my page.

</body>
</html>
```

CGI Program

- Used for interactive pages
- Format and logic combined
- "Live": pages contain live data

Net.Data Instead of CGI

Net.Data

You create
a Macro



```
%Define {  
Page_Title = "Joe's home page"  
image = "image5.gif"  
%}  
%HTML (report) {  
<html>  
<title>$(Page_Title)</title>  
<body>  
<p>Here is my page.  
  
</body>  
</html>  
%}
```

Net.Data

Net.Data IS the CGI program:
It creates the HTML!

```
<html>  
<title>Joe's home page</title>  
<body>  
<p>Here is my page.  
  
</body>  
</html>
```

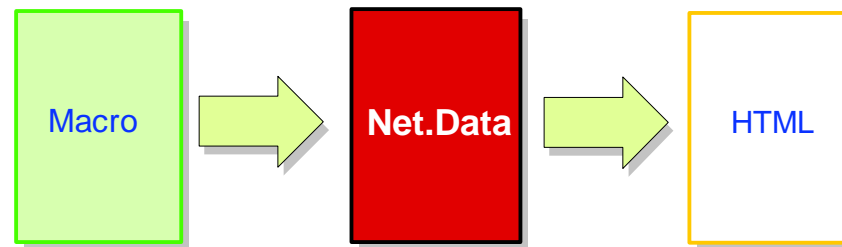
- Used for interactive pages
- Format and logic separate (like DDS)
- "Live": pages contain live data

How it works:

Macro Invocation

Net.Data is a CGI program: **db2www**

Pre-processes macro files -- Output is standard HTML



Invoked by URL:

<http://domain.com/cgi-bin/db2www/xmp.d2w/input>

*http
server
name*

*directory containing
cgi programs*

*macro
processor
name*

*macro
name*

*macro
section name*

What's needed to use Net.Data

Tools

- Any standard text editor
- Any standard HTML editor (optional)
- Any standard browser for testing

Skills

- Knowledge of HTML
- Knowledge of Simple programming constructs
 - Function calls*
 - Variable substitution*
 - If logic*
- Ability to specify (or copy existing) SQL statements (if database will be accessed)

A simple Net.Data macro

A simple HTML file

```
<html>
Good Afternoon
<p>Today's date is 10/05/98
</html>
```

Result:

Good Afternoon
Today's date is 10/05/98

URL = http://my_system.com/path/simple.html

%HTML (hello) {

```
<HTML>
```

```
Good Afternoon
```

```
<p>Today's date is 10/05/98
```

```
</HTML>
```

%}

The equivalent HTML
file written as a
Net.Data macro

Result:

Good Afternoon
Today's date is 10/05/98

URL = http://my_system.com/cgi-bin/db2www/path/simple.mac/hello

A simple Net.Data macro

```
%HTML (hello) {  
<HTML>  
Good Afternoon  
<p>Today's date is @DTW_rDATE("U")  
</HTML>  
%}
```

Generating dynamic output
using Net.Data

Result:

Good Afternoon

Today's date is 10/05/98

Use of a Net.Data built-in
function to return today's date
in USA date format
(mm/dd/yy).

A simple Net.Data macro

```
%FUNCTION (DTW_SQL) stock_price () {  
  SELECT curprice FROM rapp.stocklist WHERE symbol='IBM'  
%REPORT {  
%ROW {  
$(V1)  
%}  
%}  
%}
```

Accessing information from a
database

Function call to user
defined SQL function

```
%HTML (hello) {  
<HTML>  
Good Afternoon  
<p>Today's date is @DTW_rDATE("U")  
<p>Today's stock price is @stock_price()  
</HTML>  
%}
```

Result:

Good Afternoon

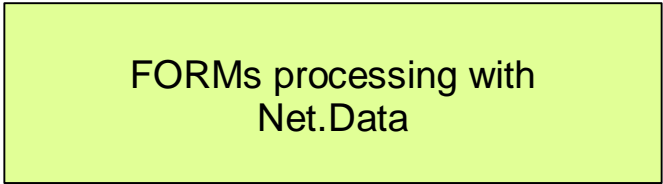
Today's date is 10/05/98

Today's stock price is 126.25

A simple Net.Data macro

```
%FUNCTION (DTW_SQL) stock_price (IN sym) {
SELECT curprice FROM rapp.stocklist WHERE symbol='$(sym)'
```

```
%REPORT {
%ROW {
$(V1)
%}
%}
%}
```



```
%HTML (hello) {
<HTML>
Good Afternoon
<p>Today's date is @DTW_rDATE("U")
<p>Today's stock price is @stock_price("IBM")
<FORM ACTION="new_stock" METHOD=POST>
Enter symbol for new stock quote:
<INPUT TYPE="TEXT" NAME="new_sym">
<p><INPUT TYPE="SUBMIT" VALUE="Get New Quote">
</FORM>
</HTML>
%}

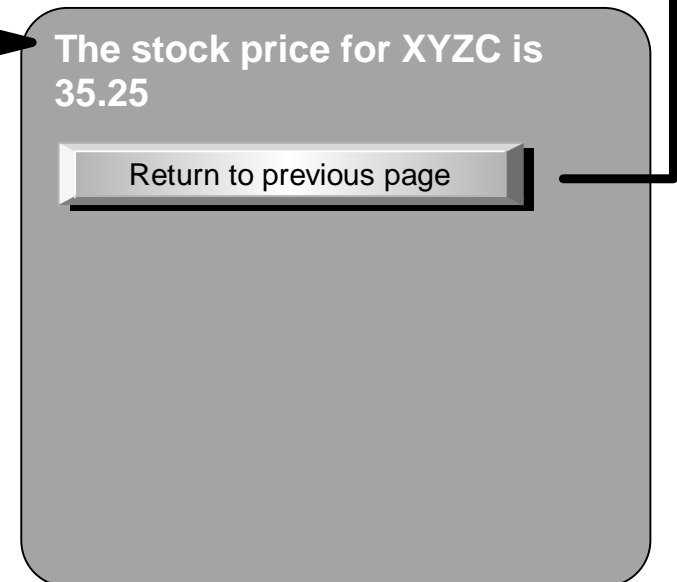
Referencing another macro section
Referencing FORM data

%HTML (new_stock) {
<HTML>
The stock price for $(new_sym) is @stock_price(new_sym)
<FORM ACTION="hello" METHOD=POST>
<p><INPUT TYPE="SUBMIT" VALUE="Return to previous page">
</FORM>
</HTML>
%}
```

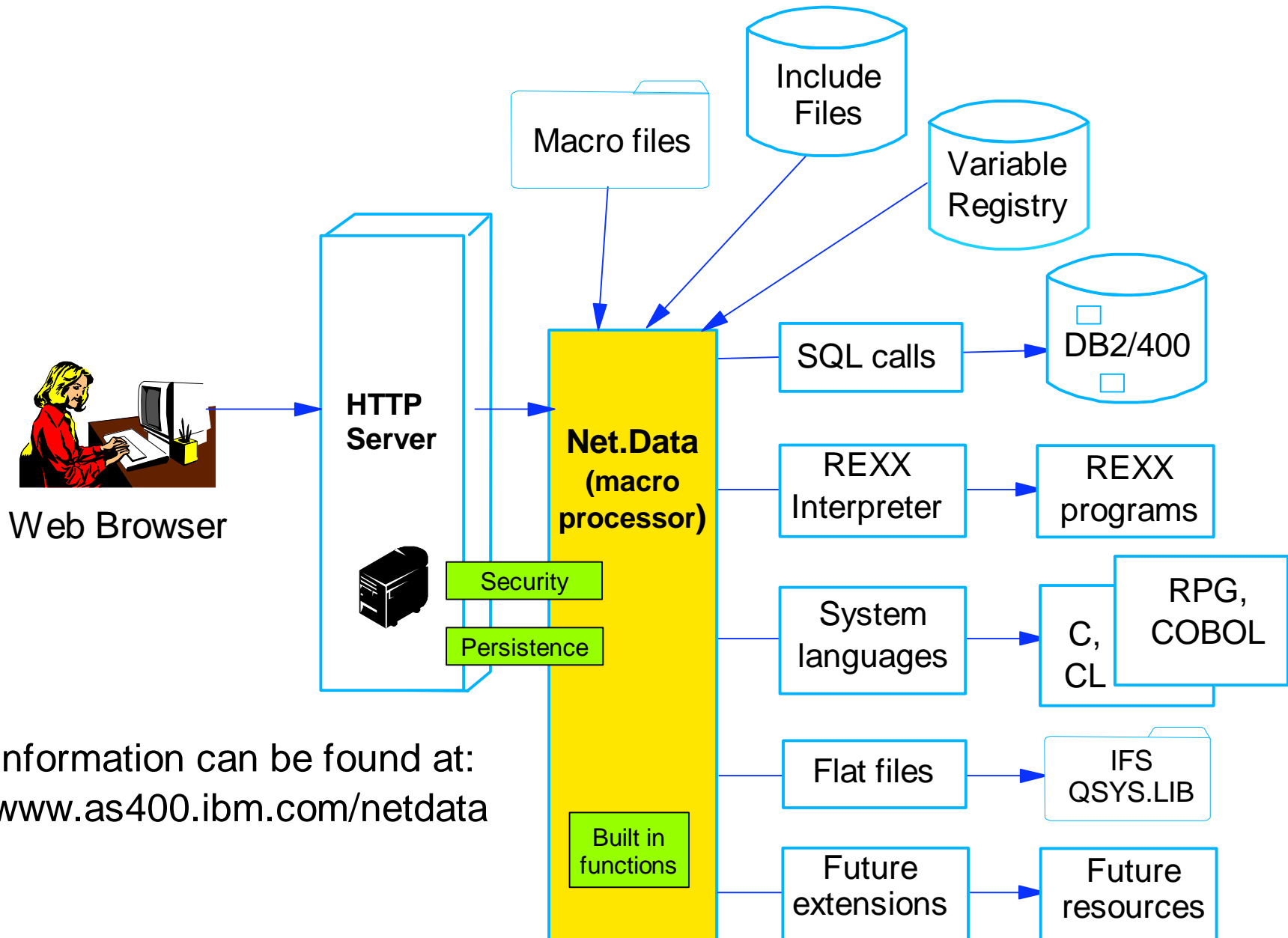
Result (hello):



Result (new_stock):



Bringing HTML alive with Net.Data



Information can be found at:
www.as400.ibm.com/netdata



What do I use Net.Data for?

As an alternative to static HTML

As an alternative to CGI programming

As a web database access tool

As an HTML forms generator

As an HTML forms processor

As a server-side scripting language

As a dynamic generator of client-side scripting code

As the server side of a distributed Java applet

As a presentation front-end to native applications

As a server resource access mechanism

As a simple mechanism of building dynamic web pages

As a complete web application development tool

Macro Language Features

Comments - Improve readability

Includes - Reuse code

Variable definitions - Manipulate strings

Function blocks - Defines reference to external function (pluggable back-ends)

Macro Function Blocks - Callable Macro language source statements

Report blocks - Describe how output from function should be formatted for browser

Row blocks - Allows loop processing for each table row

Message blocks - What to do in an error situation

EXEC blocks - Native language statements

HTML blocks - Contains HTML to be sent to the browser. Divides macro into sections.

IF, Else, While blocks - Allows conditional processing

Variable References - Uses variable substitution for dynamic HTML Form variables can be directly referenced.

Special DB variables - Like table name

Implicit table variables - Allows you to address DB table fields, column headings, etc.

Function calls - Inserts the results of a function block

Built-in functions - Often-used language functions

- **General** - Like Date, Time
- **Math** - Like Add, Subtract, Power
- **String** - Like Assign, Concatenate
- **Word** - Like Word count, Delete word
- **Table** - Pre-defined HTML table formats
- **Flat file** - Read & write IFS or QSYS.LIB files
- **Web Registry** - Manipulate web registry entries (externally defined variables)

Recently added Net.Data features

Performance improvements

SQL Language Environment improvements

- Start_Row_Num support (makes use of scrollable cursors)
- Support of user supplied system edit codes
- Support of user supplied null field strings

New Built-in functions

- DTW_Exit - Specifies to stop parsing the macro and send current results to the browser
- New Table built-in functions to manipulate a table within a macro

Ability to call Stored Procedures

- IN/OUT parameters can be specified (with type)
- Multiple result sets can be returned

Persistent Net.Data macros (available for V4R3 only)

- Allows multiple interactions with a client from a single Net.Data instance
- Great for database transactions that span multiple browser requests!

Check the Net.Data web site often for latest PTF information!



Why Net.Data?

Easier than CGI

- Handles parsing of input form data
- Handles translation of data (ASCII - EBCDIC)

Allows full functionality of HTML

- Forms
- Frames
- Dynamic HTML, XML
- Java Applets
- JavaScript
- VBScript
- ...

Extendable framework architecture for pluggable data sources

- Database, Files, Programs, Registries, Build your own

Fully NLS and DBCS enabled

- Handles all CCSID conversions

Proven technology across multiple platforms

- AS/400, OS/2, AIX, Windows NT, OS/390, Sun Solaris, HP-UX

Comes with every OS/400 license



Who uses Net.Data?

IBM AS/400 Tasks page

- HTTP and SSL configuration
- Firewall configuration
- Digital Certificate Manager
- Network Station configuration
- Net.Commerce configuration

Net.Commerce

Winter Olympics in Nagano, Japan web page

- <http://www.nagano.olympic.org/>

Many others

- see <http://www.software.ibm.com/data/net.data/news/ndcust.html>



Visit Our Web Site

For More Information

Net.Data

<http://www.as400.ibm.com/netdata>

Latest information, PTF info, documentation, demos, sample code, forum

Net.Data on Other Platforms:

<http://www.software.ibm.com/data/net.data/>

AS/400 Web Applications in general:

<http://www.as400.ibm.com/techstud/workshop/webbuild.htm>

AS/400 Web Builder's Workshop

<http://as400bks.rochester.ibm.com/cgi-bin/idhome.exe>

SG24-4815 "Cool Title About AS/400 and Internet" (red book)

SG24-4935 "Unleashing AS/400 Applications on the Internet" (red book)



Appendix

The following are trademarks of IBM Corporation:

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- OS/2
- AS/400
- AIX
- OS/390
- REXX
- DB2

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