

VisualAge RPG: Fundamentals

IBM Toronto Development Laboratory

Claus Weiss weiss@ca.ibm.com

Session ID: 13TA

WDT/400

New World

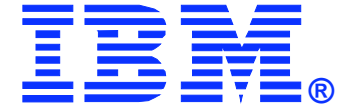
New Servers

New Tools

www.ibm.com/software/ad/wdt400



Acknowledgment and Disclaimer



AS/400 Application Development

Acknowledgment:

Many people contributed to this presentation. In particular, thanks goes to Claus Weiss - IBM Corporation for creating the original presentation.

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→ My email:

weiss@ca.ibm.com

→ VARPG homepage:

<http://www.ibm.com/software/ad/wdt400> <==== **New**

→ VARPG Newsgroup:

<news://news.software.ibm.com/ibm.software.varpg>

- Overview
- The GUI designer
- The VARPG language
- GUI Subfile programming
- The debugger
- What's new
- Live demo of VARPG

VisualAge RPG Overview

You know RPG ? Yes you can do it

Build client/server applications with RPG!

GUI builder to design multimedia interfaces

Easily create GUI screens

Drag and drop new technologies such as image, audio

Logic behind GUI is RPG

Familiar language

Familiar database

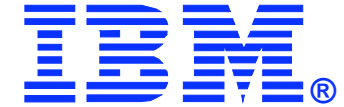
Integration with CODE/400

Visual development tool

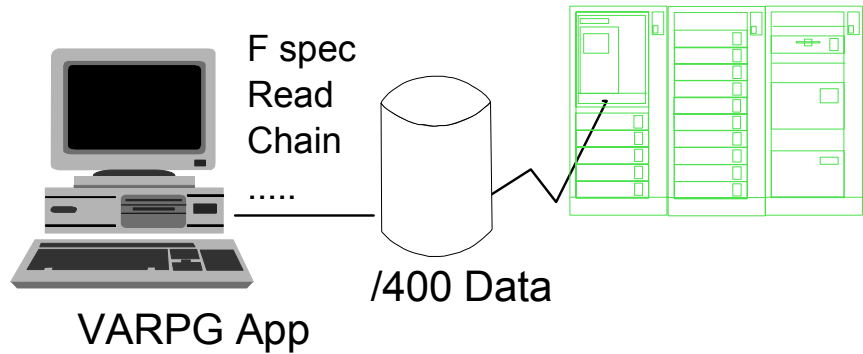
Easily enhanced with customized parts and components

No runtime license required for VARPG applications!

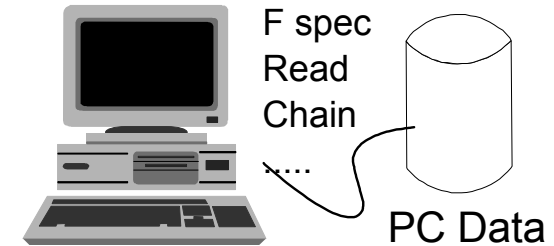
VARPG - Application Scenarios



Remote Data

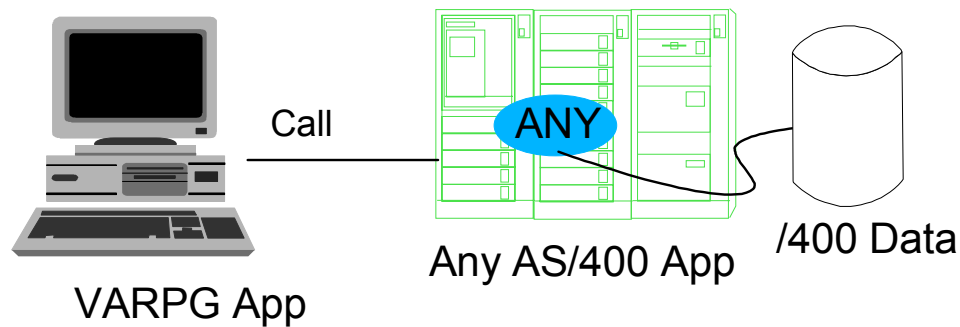


PC Application



VARPG

Distributed Logic

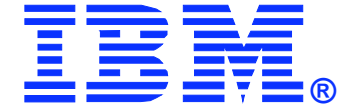


CODE/400

NPT (5250) Application



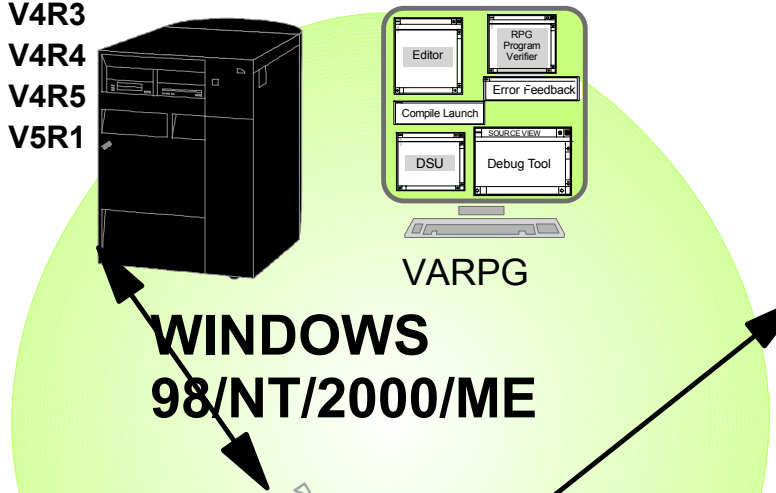
VARPG Run Time and Development



AS/400 Application Development

Development Environment

V4R3
V4R4
V4R5
V5R1

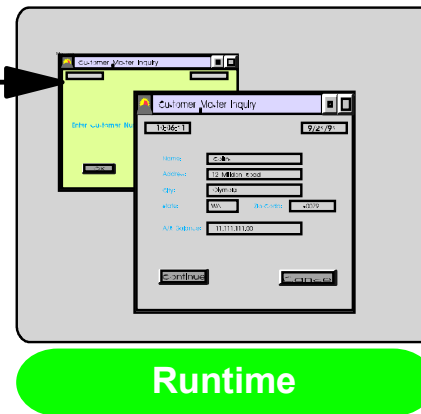


Run Time Environment Windows 98/NT/2000/ME



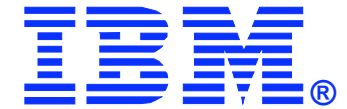
V4R3
V4R4
V4R5
V5R1

JAVA virtual machine JAVA2 level



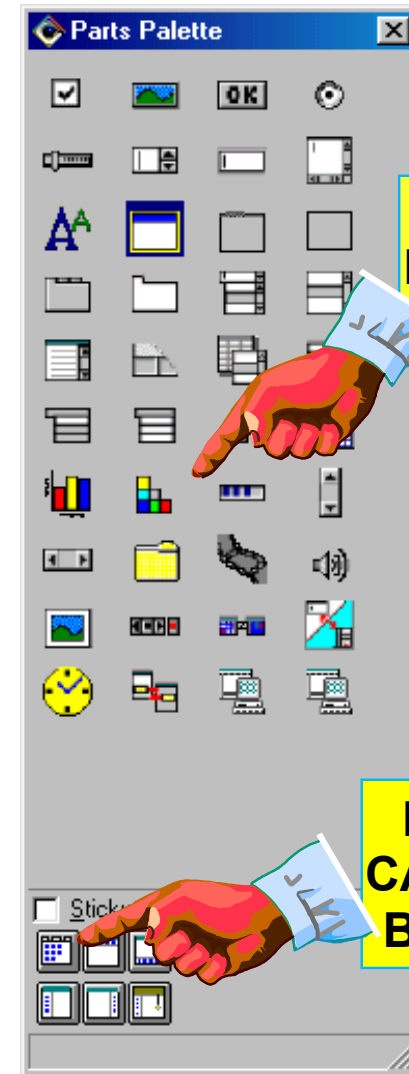
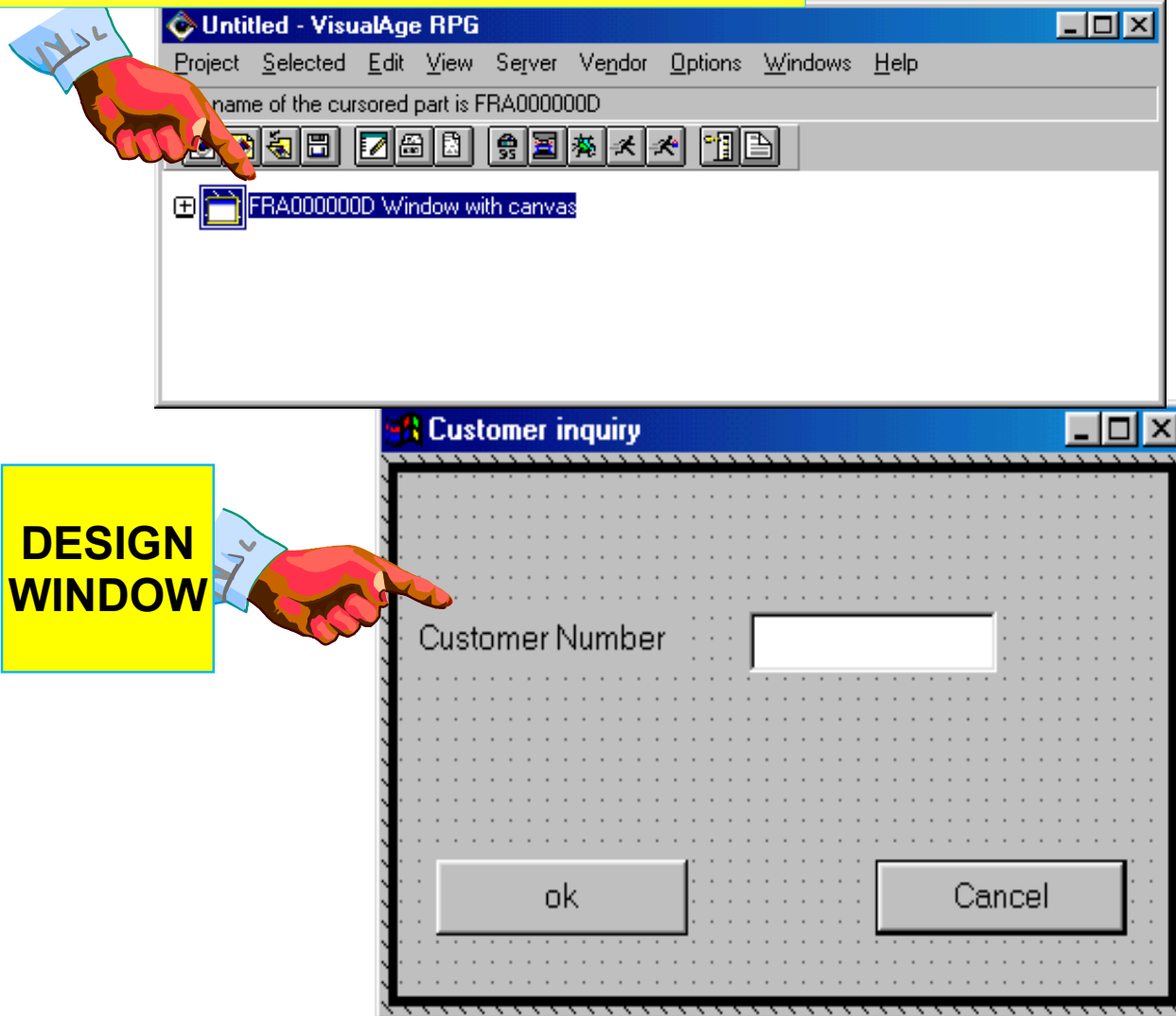
V4R3
V4R4
V4R5
V5R1

Using The GUI Designer



AS/400 Application Development

Project View



PARTS PALETTE

DESIGN WINDOW

PARTS CATALOG BUTTON

Parts and Events

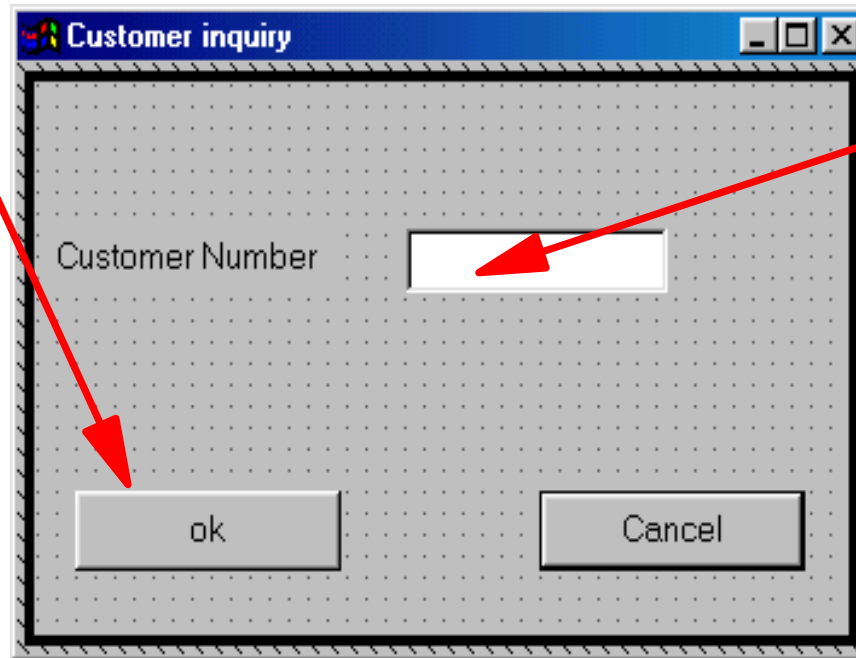
Part:
Pushbutton

Attributes:

- BackColor
- Border
- FontSize
-

Events:

- Press
- Create
- Destroy
- MouseMove
-



Part:
Entry Field

Attributes:

- Backcolor
- Text
- DataType
-

Events:

- Change
- Drop
- MouseMove
- DbClick
-

Part Settings Notebook

Part Name

Used as "Field" name

Label

Text appears on part

Tooltip

Help info for enduser

Also specifies :

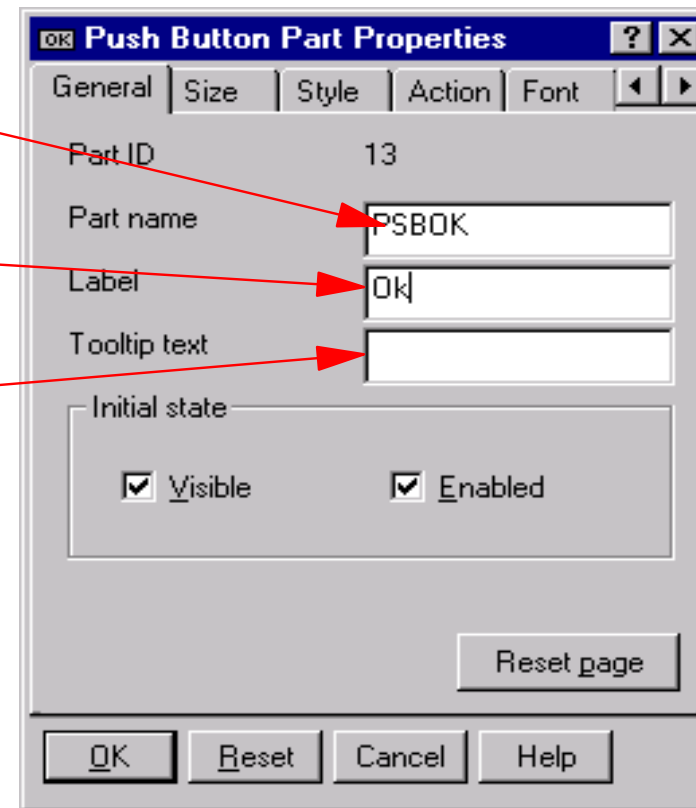
Size

Style

Font

Colors

Description



Attributes

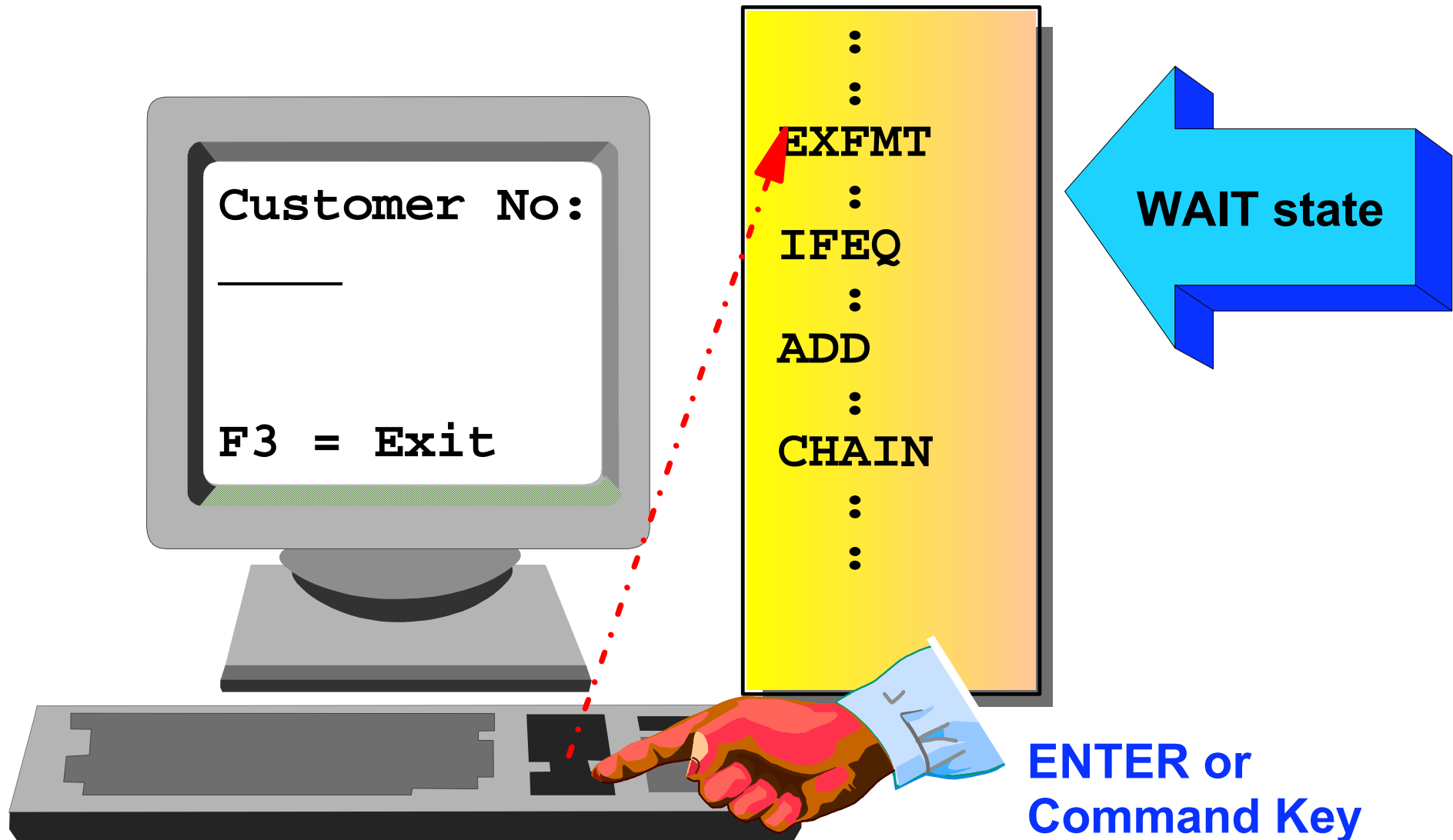
Visible

Enabled

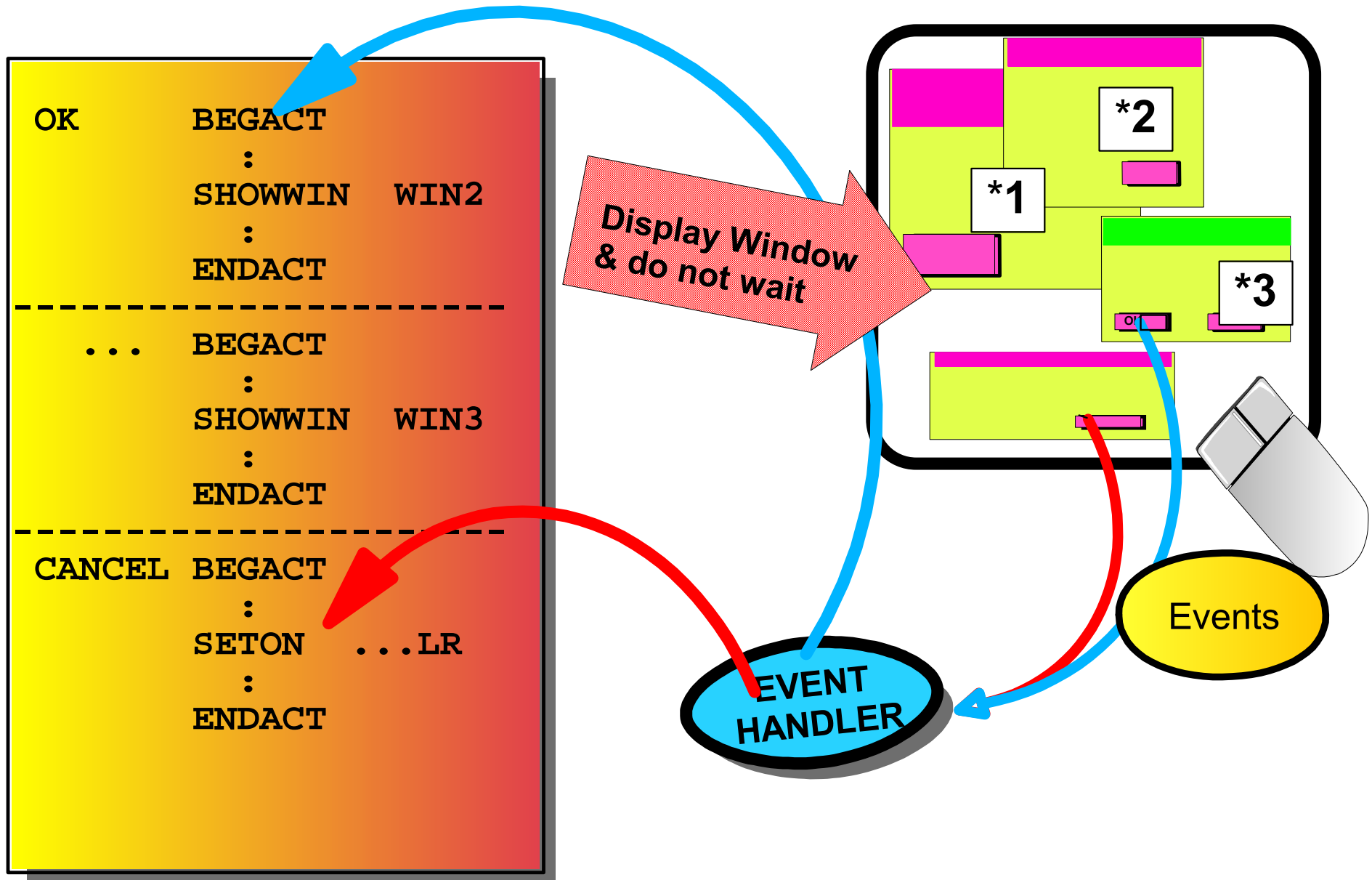
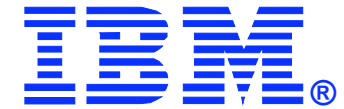
PROCEDURAL MODEL



AS/400 Application Development



EVENT DRIVEN MODEL



Design Considerations

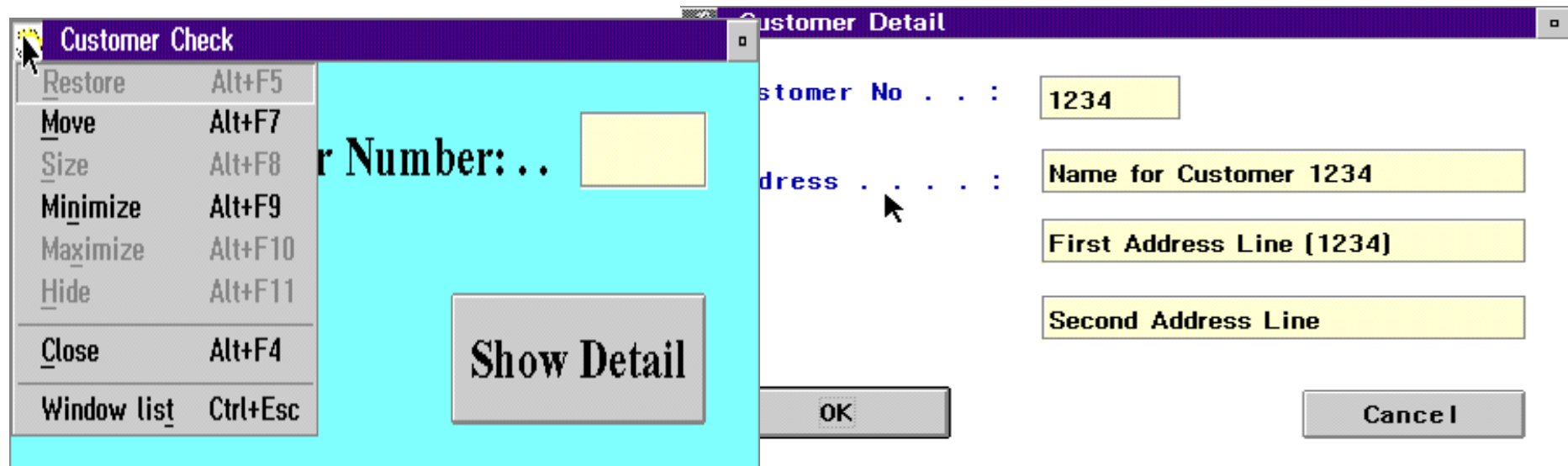
Event driven GUI applications are different

Users can "drive" the application the way **THEY** want!

What they expect to be able to do is a major factor!

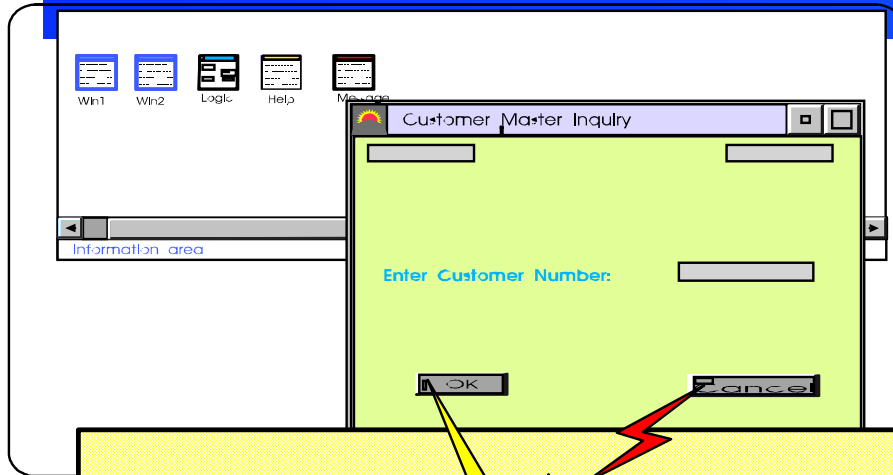
remember they're often using PCs at home

You must account for things that can't even occur with 5250



Adding RPG Code

Global Area



FCUSTMSTL IF E K Disk **REMOTE**

```

C      CANCEL          BEGACT      PRESS          CUSFMT
C      *Set on LR to e the program
C      MOVE           *ON           *INLR
C      ENDACT

```

```

C      OK             BEGACT      Press          CUSFMT
C      * Locate customer in file
C      CUST           CHAIN         CUSREC
99
C                   IF             *In99
C                   :
C                   ELSE
C      * Customer was found, display update panel.
C      SHOWWIN      'CUSFLDS '
C
C      END
C      ENDACT

```

The LPEX Editor

- Programmable
- Extensible
- Color coding
- Context Sensitive
- Prompting
- Help
 - *It's the manual!*
- Shared with CODE/400
- SEU profile

```

*****
*
* Action . . : CANCEL
*
* Description: Terminate when CLOSE selected from system pulldown
*               or CANCEL button pushed
*
*****
C      CANCEL      BEGACT
C
C      EVAL      *InLR = *On
C
C      ENDACT
    
```

Code	Factor 1	Factor 2	Result Field	Indicators
BEGACT	Part name	Event name	Window name	

The BEGACT operation defines the start of an action subroutine. When an event for a part occurs, the action subroutine is called.

Factor 1 contains the part name. Factor 2 contains the event name. The result field contains the name of the window containing the part.

Attribute Operations

Fixed form

GETATR & SETATR

Factor 1	Op-code	Factor2	Result
Part	GETATR	Attribute	AttrValue
Part	SETATR	AttrValue	Attribute

Apply to the default (active) window

Free form

%GETATR & %SETATR

Op-code	Factor2
EVAL	AttrValue = %GETATR(Window :Part:Attribute)
EVAL	%SETATR(Window :Part:Attribute) = AttrValue

Can affect any "loaded" window

Manipulating Part Attributes

AS/400 Application Development

Customer Check

Enter Customer Number: ...

Entry field: CUSTOMERNO

Button: CHECKIT

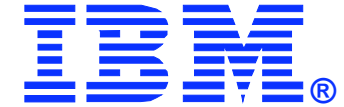
```

C CUSTOMERNO  [BEGACT  GOTFOCUS  WIN1
C 'CHECKIT'   SETATR   *PALEGRAY
C                                     ENDACT
    
```

```

C CHECKIT [BEGACT PRESS WIN1
C EVAL CustNo = %GETATR('WIN1': 'CUSTOMERNO': 'TEXT')
C EXSR ReadCust
C IF RecStatus = Missing
C ErrMsg DSPLY ErrBox ErrReply
C ELSE
C IF CredStatus = Good
C EVAL %SETATR('WIN1': 'CHECKIT': 'BACKCOLOR') = *BLUE
C ELSE
C EVAL %SETATR('WIN1': 'CHECKIT': 'BACKCOLOR') = *RED
C .....
    
```

New Operation Codes



✓	BEGACT	<i>begin an Action subroutine</i>
✓	ENDACT	<i>ends an Action subroutine</i>
	SHOWWIN	<i>creates a window</i>
	CLSWIN	<i>destroys a window</i>
✓	GETATR	<i>get part attribute value</i>
✓	SETATR	<i>set part attribute value</i>
	READS	<i>read subfile selected record</i>
	START	<i>invoke another component</i>
	STOP	<i>stop a component</i>
	*TERMSR	<i>terminate subroutine</i>

Changed Operation Codes

- ⊗ **CALL** *call an AS/400 program*
 - ⊗ **CALLB** *call a function*
 - ⊗ **CALLP** *call workstation program/procedure*
 - ⊗ **CLEAR** *clears entry fields and subfiles*
 - ⊗ **DSPLY** *displays a message box*
 - ⊗ **READ** *reads entry field values from a window*
 - ⊗ **RESET** *resets window values*
 - ⊗ **TIME** *return system date/time*
 - ⊗ **WRITE** *sets entry field/static text values*
- *INZSR** *initialize subroutine*

Displays Dialogue box

Three styles

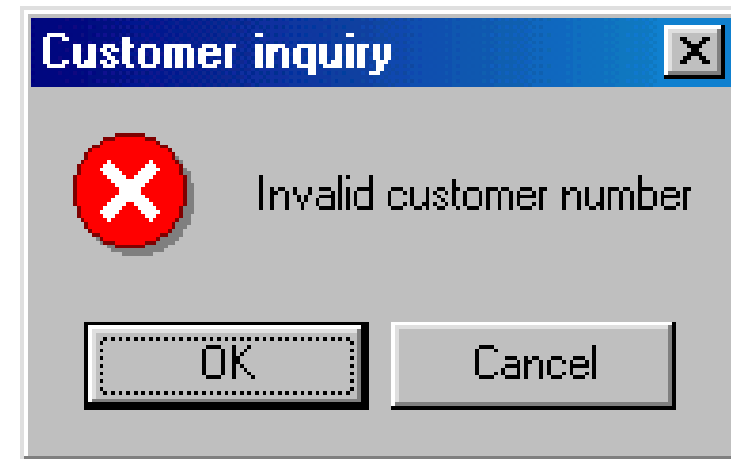
**INFO *WARN & *HALT*

Use literal, field, or Message

Input responses

**OK *Cancel *Retry *Abort *Ignore*

**Enter *YesButton *NoButton*



```
D ErrMsg          C      .....      'Invalid Customer Number'
D ErrBox          M      .....      STYLE(*HALT)
D                               Button(*ok:*cancel)
C   ErrMsg        DSPLY      ErrBox      Reply
C                               If         Reply=*ok
```

RPG Functions Not Supported

- ❖ ***RPG Cycle***
- ❖ ***WORKSTN files***
- ❖ ***Host Printer Files***
- ❖ ***Operation Codes:***

- ▶ **ACQ**
- ▶ **REL**
- ▶ **FREE**
- ▶ **NEXT**
- ▶ **DUMP**
- ▶ **DEBUG**

- ▶ **MHHZO**
- ▶ **MHLZO**
- ▶ **MLHZO**
- ▶ **FORCE**
- ▶ **SHTDWN**

Program Source Structure

Definition Specs

All logic written in subroutines or procedures

- Action Subroutines
- User Subroutines
- Sub Procedures
- *INZSR
- *TERMSR
- *PSSR
- *ENTRY
- KLISTs



One source file per applicaton

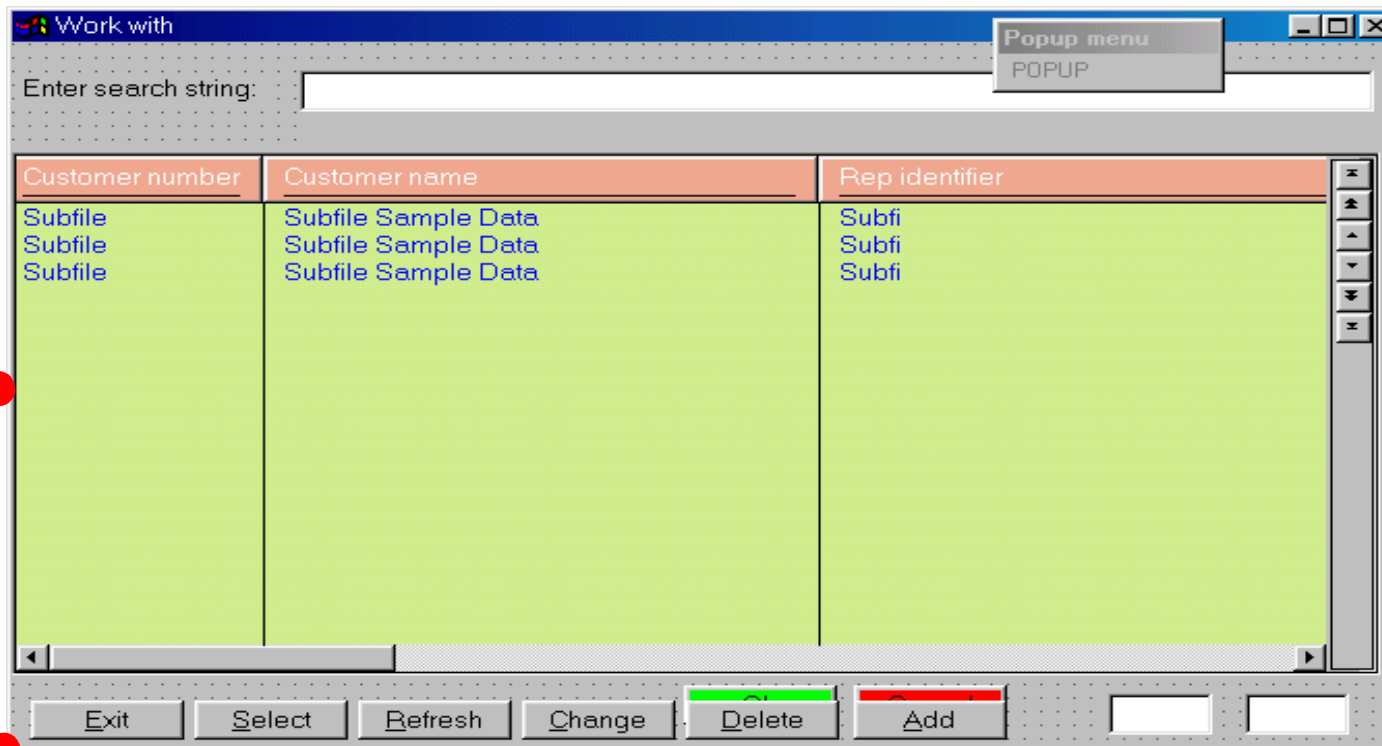
```

H
*
F
*
} Define files
D
D
D
D
*
I
I
I
I
} Local input files
Special files
*
C
C
C
C
C
C
*
O
O
} Printer files
Local output files
*
P
D
C
C
C
P
** -Array data

```

- ▶ RPG IV Syntax
- ▶ 10 character names
- ▶ Mixed case
- ▶ Keywords

What about Subfiles?



No subfile control record
 Additional op codes
 Clear
 Reset

SUBFILE is a GUI object

Just drag and drop database reference fields or define your own field list

All existing Subfile op-codes are supported

READC, DELETE, CHAIN, UPDATE

Plus new **READS** (Read Selected)


Subfile and Image Example



Product Inquiry

Stock on hand. To display an image of the item, select the item then press the SELECT push button, or double click the item

Number	Model	Price
00004	AR-1	3.96
00004	AR-12	1.76
00004	AR-13	4.35
00005	AR-1	2.97
00005	AR-10	4.50
00005	AR-11	1.78
00005	AR-12	3.52
00013	AR-1	110.42
00013	AR-10	158.88
00013	AR-11	156.80
00013	AR-13	153.06
00014	AR-1	43.56
00014	AR-10	6.30
00014	AR-13	38.28
00014	AR-15	30.60
00015	AR-1	18.81

 100%

Product Detail

Part number: 00013
Model number: AR-13
Wholesale: \$153.06
Retail: \$198.78
Discount: Yes No

Subfile and Image Example (contd.)



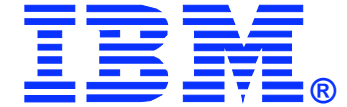
```
* Action . . . . : NEXT
* Description . : Get another page of records if any remain
*                Disable 'Next' button once all records loaded
```

```
C      NEXT          BEGACT    PRESS
C                IF          Loaded < MaxRecs
C                EVAL        Count = 0
C                DOW         Count < PageMax AND Loaded < MaxRecs
C                EVAL        Count = Count + 1
C                EXSR        LoadRec
C                ENDDO
C                ENDIF
C                IF          Loaded = MaxRecs
C      'Next'        SETATR    Disable      'Enabled'
C                ENDIF
C                ENDACT
```

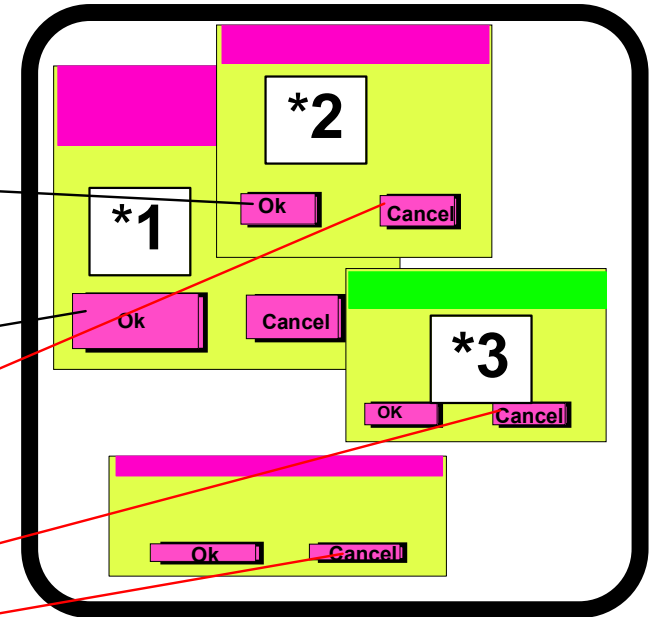
```
* Action . . . : SELECT
* Description: When subfile record selected, set the image file
*                name from the selected record's data
```

```
C      SUBFILE1      BEGACT    SELECT
C                reads      SubFile1          99
C                EVAL      ImageName = %TrimR(ProdImage) + '.BMP'
C                EVAL      %SetAtr('SUBFDEMO':'IMAGE':'FileName')
C                = ImageName
C                ENDACT
```

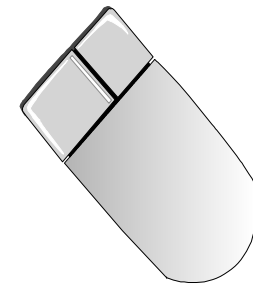
Event Action links



```
OK      BEGACT
        :
        : SHOWWIN  WIN3
        :
        : ENDACT
...
        BEGACT
        :
        : SHOWWIN  WIN4
        :
        : ENDACT
CANCEL BEGACT
        :
        : SETON   ...LR
        :
        : ENDACT
```



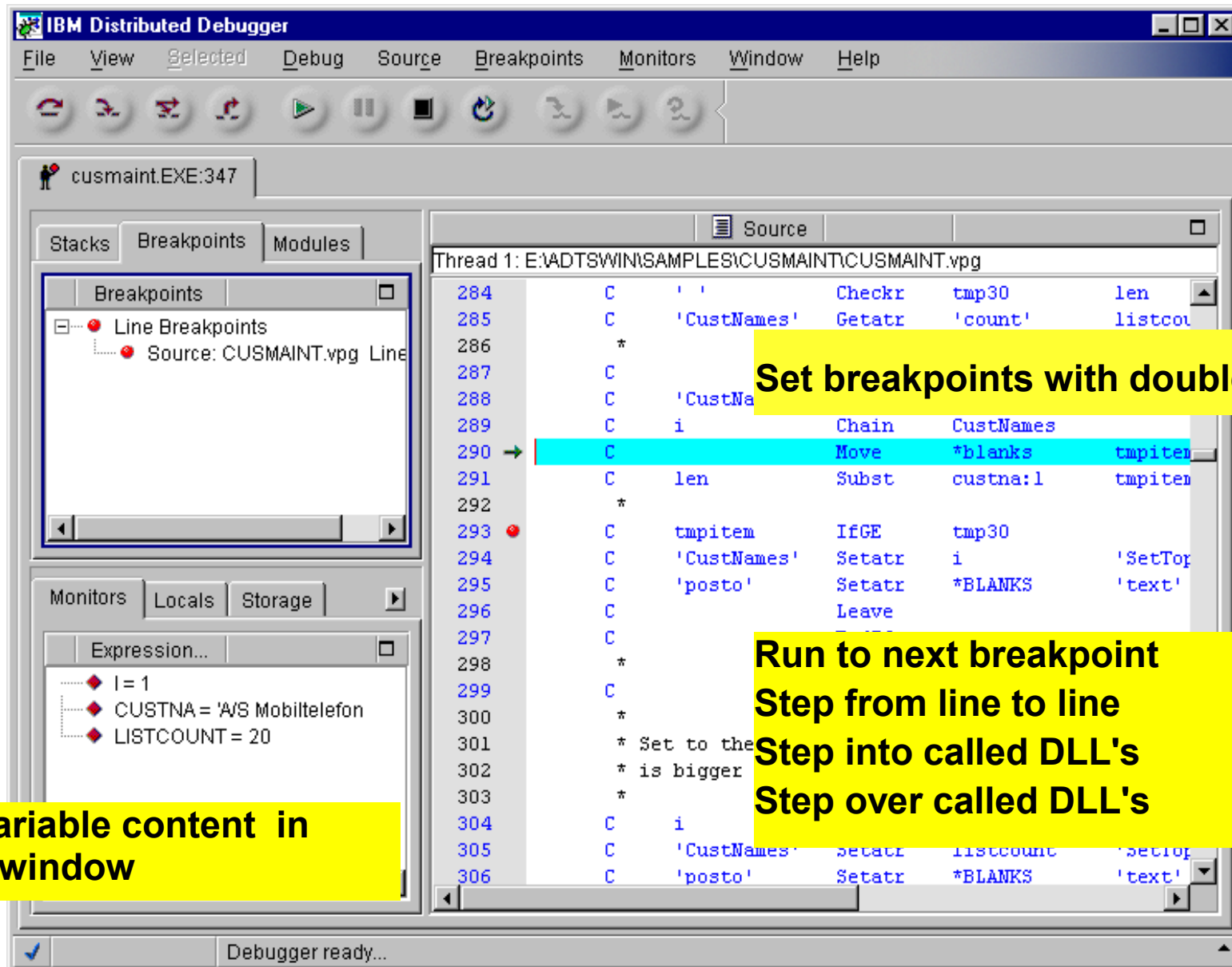
Multiple Links are allowed



Built in source level debugger



AS/400 Application Development



Watch variable content in monitor window

Set breakpoints with double click

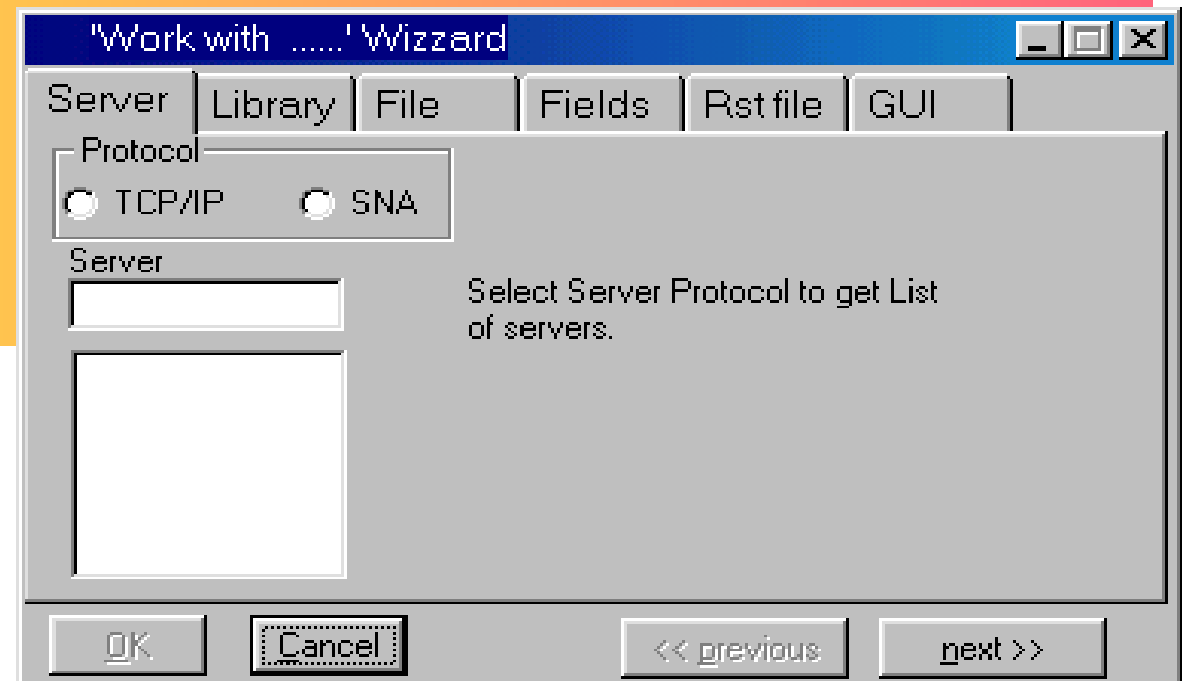
Run to next breakpoint
Step from line to line
Step into called DLL's
Step over called DLL's

Many more features

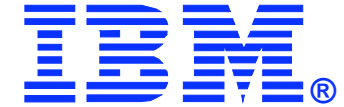
- ODBC support
- Many subfile enhancements
 - Sorting of columns
 - Changing location of columns at runtime
- Each new release contains many features user requested
- Additional Parts that come in handy
 - Graph part
 - Calendar
 - Progress bar, Animation part
 - ActiveX part
- Synchronization with RPGIV language definition (VARPG is at the moment at RPGIV V4R4 level)
- **JAVA source generation**

Wide variety of built in parts

- Try different parts, like:
 - Radio buttons
 - Check boxes
 - Container
 - Notebook/Notebook pages
 - Calendar
 - Pop-Up Menus
 - Multi line edit



Linemaster (USA) MAPICS frontend



AS/400 Application Development

Product Structure

Include Inactive/Deleted Components

Parent Item # Revision **ACTIVE**

Description

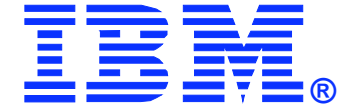
Act	Bal	Item #	Description	Qty Per	F/O	O
A		LSC-1027-8	Carton 2 15/16 x 1 1/16 x 3 5/8	1.0000	N	N
A		LSC-1027-9	Carton W/ Logo 18 3/4 x 11 1/4 x 6	.0100	N	N
D		LSC-1056	***** Deleted	.0000	*	*
A	11	LSC-1075	Warning Label English/French/Spar	1.0000	N	N
A		LSC-206-56	Carton Label Treadlite II T-91-S CE	.0200	N	N
D		LSC-227-11	***** Deleted	.0000	*	*
D		LSC-227-4	***** Deleted	.0000	*	*
A		LSC-375-16	Polybag (5 X 7) with warning	1.0000	N	N
A	1	LSC-567-20	Yellow Pre-inked Stamp	.0010	N	N
A	16	LSC-793-26	Petrolon Grease Lubricant	.0010	N	N
A	9	LSC-947	Warning label English	1.0000	N	N
A	19	4-475-P3	#8-32 Combo Head Carbon Steel .21	2.0000	N	N
A	15	514-N3	Interior	1.0000	N	N
D		515-B37	***** Deleted	.0000	*	*
A	10	515-CA	Cover Steel	1.0000	N	N

Effective Date From: To: .0000 N N

Update Delete

Page Up Page Down Print Copy BOM Delete BOM Close

Versatile (Australia) inventory sample



AS/400 Application Development

Inventory - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites History

Address C:\Documents and Settings\claus\My Documents\ACE\Inventory.html

Item Selection

File Edit Help

Position To / Select (*)

Item Description Abbr.Desc Company
Part No. Reference ? X ? X Full Desc 1

Filter

Category ? X DSK
Price Book ? X

Cat.	Item
DSK	PCKIT10
DSK	5825715
DSK	5825717
DSK	5826715
DSK	5826717
DSK	6275B3A
DSK	6275B8A
DSK	6275G3A
DSK	6275G5A
DSK	6275H1A
DSK	6275H3A

Purchasing Description

Desktop Bundles
6287-69A (PII400)& 15"

Item Detail

File View Help

Details Purchasing Selling Pricing Discounts Stock References

Identification

Company 1
Item PCKIT10
Description 6287-69A (PII400)& 15" Mon G54
Category ? DSK PC Desktops
Price Book ?

Usage **Type** **Valuation Method (Each)**

Stocked Normal Last Price 22.07.1999 .00
 Non-Stocked Component .00
 Service Other

Status

Date Item Available ? X
Date Price Updated ? X
Date Cancelled ? X

Select Date

Jul, 1999

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

Done My Computer

San Marco (Italy) ERP sample



AS/400 Application Development

POOL ITALIA - Simulazione M.P.S. - M.R.P.

Help

Numero Lancio: 00010 SIMULAZIONE DEL 05/03
 Data Inizio Pianif.: 5/03/01 Proprietà: 0 Magazzino: 100

PARAMETRI | DATI LANCIO | ORDINI SIMULATI | IMPEGNI MATERIALI | IMPEGNI TEMPO | CARICO C.d.L. | RISIMULAZIONE/CONFERMA

Solo C.d.L. Simulazione < Carico -100% -75% -50% -25% 0 +25% +50% +75% +100% > Carico Ricalcolo Carico C.d.L. Simulazione

Centro di Lavoro	Descrizione	Potenz. Giorni	Um	Nr. ORE Totale Periodi	Nr. ORE Prima	Sett. 10/2001 gg.05	Sett. 11/2001 gg.05	Sett. 12/2001 gg.05	Sett. 13/2001 gg.05	Sett. 14/2001 gg.05	Sett. 15/2001 gg.05	Sett. 16/2001 gg.05	Sett. 17/2001 gg.05
402	Piegatura	16		229,29			2,25	2,25	39,15	32,00	42,19	19,80	
502	Verniciatura caldo	32		219,66					8,33	30,75	98,26	56,49	
601	Assemblaggio	40		999,96		3,08	287,77	69,02	176,46	143,50	87,74	89,23	
602	Confezionamento	16		529,81		2,50		225,56	33,32	24,99	43,32	43,66	
701	Collaudo	16		32,69		33	7,90	1,02	1,32	99	2,64	2,85	
804	Assemblaggio	48		34,78									
TOTALE				3.578,15		5,91	460,31	656,01	541,62	601,99	526,87	317,92	

Grafico

Grafico Dettagliato

Bilanciamento Totale Potenziale Totale

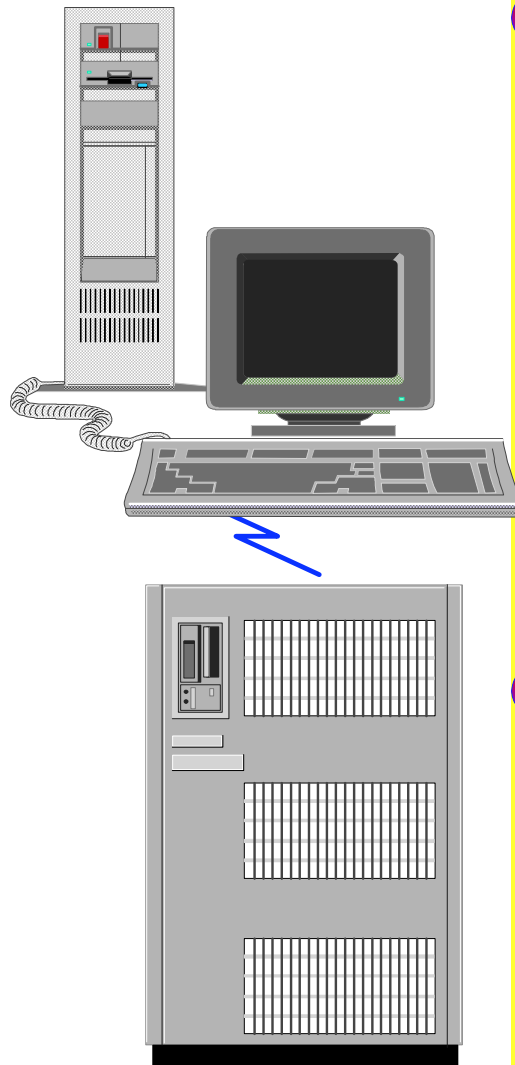
BILANCIAMENTO CENTRI SELEZIONATI

CdL	Mch	Descrizione	Data	Articolo	De
602	055	Linea conf. 1	19/03/2001	30001000	ELETTROPOMPA
602	055	Linea conf. 1	19/03/2001	30001001	ELETTROPOMPA
602	055	Linea conf. 1	19/03/2001	30001001	ELETTROPOMPA
602	055	Linea conf. 1	19/03/2001	30001001	ELETTROPOMPA
602	055	Linea conf. 1	19/03/2001	30001001	ELETTROPOMPA
602	055	Linea conf. 1	19/03/2001	30001001	ELETTROPOMPA
602	055	Linea conf. 1	19/03/2001	30001001	ELETTROPOMPA
602	055	Linea conf. 1	19/03/2001	30001001	ELETTROPOMPA
602	055	Linea conf. 1	19/03/2001	30001002	ELETTROPOMPA
602	055	Linea conf. 1	19/03/2001	30001002	ELETTROPOMPA

Chiudi Grafico Stampa Grafico

Potenziale/Dre: 16,0000 Totale Carico Periodi: 294,5700
 Totale Potenziale Periodi: 640,0000

VARPG: What You Need



Technical Environment

- Pentium processor
- 128 Mb main memory (recommended)
- Disk space:
 - **VARPG uses 350MB when fully configured**
- Color display and mouse (recommend SVGA)
- *Windows 98/ME/2000/NT*

Communications Options

- (TCP/IP)
- iSeries System
- OS/400 V4R3 or later

WebSphere Development Tools for AS/400

Includes **CODE/400**

- ✓ For RPG, COBOL, CL, C, C++, DDS

VisualAge RPG

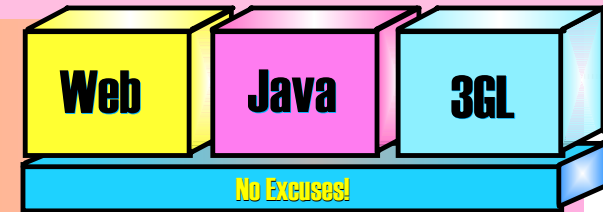
- ✓ For RPG GUI

VisualAge for Java for AS/400

- ✓ For Java
- ✓ Pro plus Enterprise Toolkit for AS/400

WebSphere Studio For AS/400

- ✓ For Web sites and Web pages
- ✓ Standard plus Affinity Toolkit for AS/400



www.ibm.com/software/ad/wdt400

Summary



- ✓ **VARPG provides a complete C/S solution when combined with CODE/400**
 - ✓ **Create your own tools with the *Plug in* interface**
 - ✓ **VARPG provides access to all GUI features with a built-in direct interface and allows you to access Windows API's**
 - ✓ **Use all new RPGIV features on the Client and on the Server**
 - ✓ **Access data**
 - ✓ **in DB/400**
 - ✓ **in local ASCII files**
 - ✓ **or with embedded SQL in all DB/2 supported servers**
 - ✓ **in ODBC databases**
- **>>> Use your RPG skills and build GUI applications <<<**

**Enjoy working with
VisualAge RPG!**

-- Demo --