



PathPoint Software

*Understand How Mainframe Applications Really Work
As They Execute*

A Personal Productivity Tool for
Mainframe Application Developers





PathPoint is a Mainframe Product

Environments

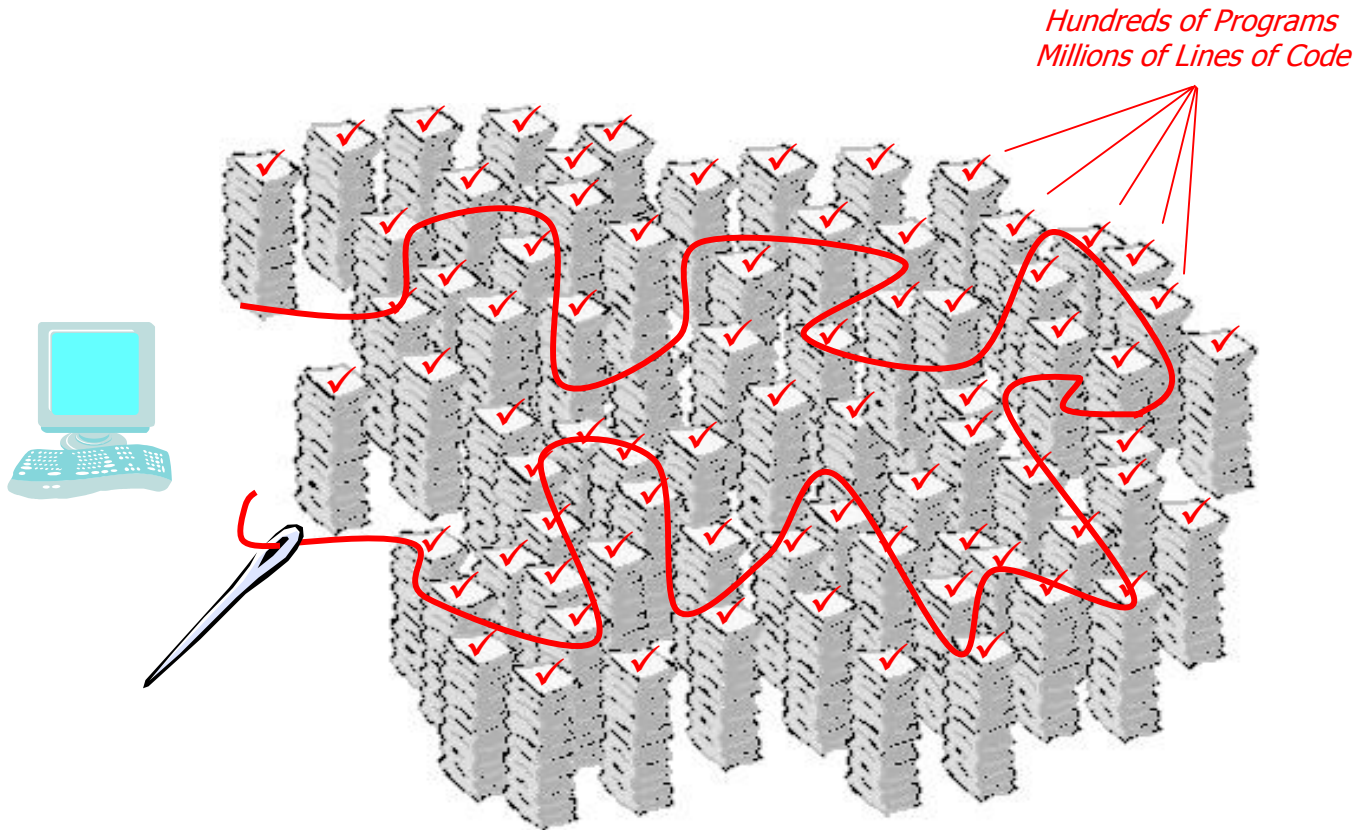
- Operating Systems
 - z/OS
- Table / File Access
 - VSAM
 - DB2
 - IMS
 - Temp Storage
 - Transient Data
- TP Monitors
 - CICS
- Batch Environments
 - DB2
 - IMS
 - VSAM/non-VSAM (*Beta*)

PathPoint Basics

- ✓ Execution Based
- ✓ Source Code Independent
 - No changes required
- ✓ Language Independent
 - Cobol
 - Assembler
 - PL/1
 - Java
 - C

The PathPoint Breakthrough

Finding the Right Code in Legacy Mainframe Applications



PathPoint Identifies the Unique Thread of Application Processing
..... Followed By Specified Business Transactions

Finding the Right Code

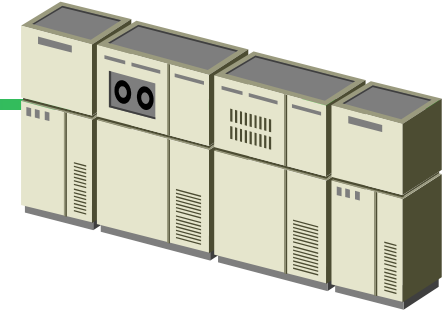
Necessary for Successful Projects

Building for the Future

- ✓ SOA
- ✓ Transformation / Modernization
- ✓ Componentization

Managing the Present

- ✓ Change Requests
- ✓ Problem Determination
- ✓ Performance Assessment



PathPoint
Provides The
Keys to Success

HOW the applications
really work

WHERE to make the
changes

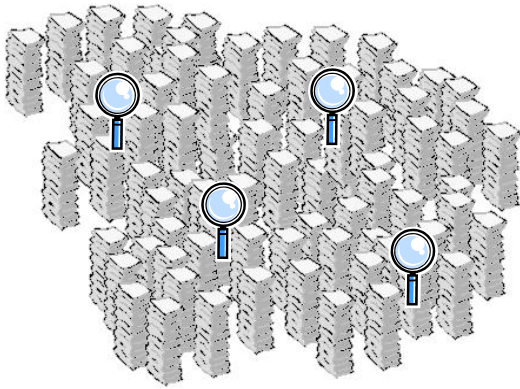
**The Right
Code**



Traditional Mainframe Application Analysis

Finding the Right Code is Challenging

Analyze Static Source Code – *Play Computer*



- Which Programs are Involved?
- Where in the Programs do I Make Changes?

Decisions are Made Without Understanding How the Application Really Works

Impact on Mainframe Application Projects

- Analysis and Design Time – *30-40% of the Project*
- Testing Time – *30-40% of the Project*
- Downstream Problems – *Due to Inaccurate Analysis*



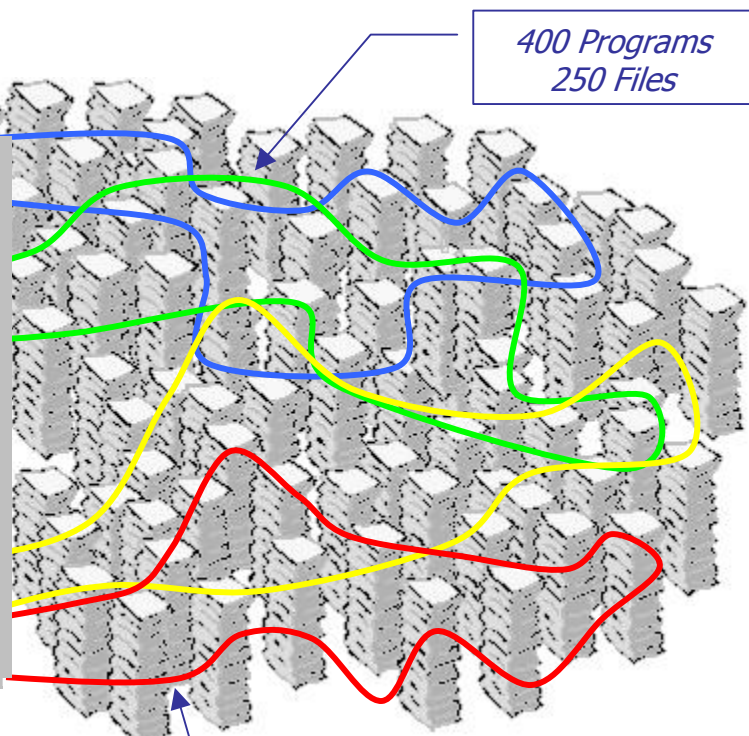
Why Is It So Hard to Find the Right Code?

Because Applications are Comprised of Hundreds of Programs

Actual Application Processing Paths ... Are Very Complex



Account Number	1004
Customer Name	Hillman Associates
P.O. Number	A44065
Customer Contact	Mark Copeland
Ship To Location	12 East 60 th Street Tulsa, OK 74146
Bill To Location	12 East 60 th Street Tulsa, OK 74146
Item Number	AS54386
Quantity	3



The Right Code



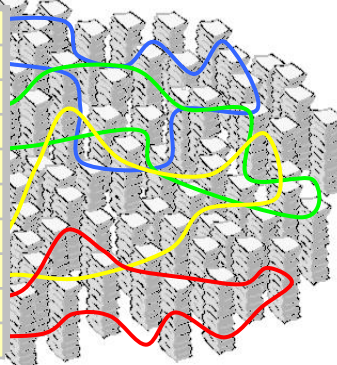
It's In There Somewhere

PathPoint Helps You Find The Right Code

Specified Users Simply Enter a Business Transaction . . .

PathPoint traces and captures the actual application processing paths followed by specified user-entered business transactions - *as they execute*

Account Number	1004
Customer Name	Hillman Inc.
P.O. Number	A44065
Customer Contact	Mark Copeland
Ship To Location	12 East 60 th St. Tulsa, OK 74146
Bill To Location	12 East 60 th St. Tulsa, OK 74146
Item Number	AS54386
Quantity	3



- Understand Which Programs are Involved
- Know Where in the Programs to Make Changes
No code changes; Language independent; Online or Batch

Make Decisions Based Upon How Your Mainframe Applications Really Work

The Value of Finding the Right Code

- Analysis and Design Time → **50% Reduction**
- Testing Time → **Reduced Significantly**
- Downstream Problems → **Minimized**



PathPoint Is Easy To Use

On-Line or Batch

Specified User
Enters Desired
Business Transactions

On-Line - by User-ID



Account Number	1004
P.O. Number	A44065
Item Number	AS54386
Quantity	3

Enter - New Orders

OR

Batch - by DB2 Plan Name



Identify – Job Name and Step #

Mainframe Component
Traces & Captures
Processing Paths
As Application Executes

Only by Identified User



Captured Results
Downloaded
To PC Workstation
For Analysis



PathPoint *Captures* Execution-Based Information

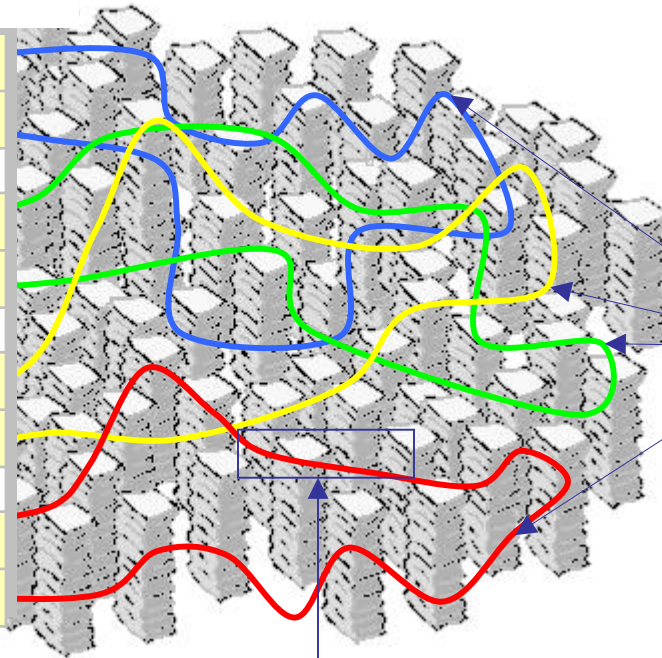
The Key to Understanding Mainframe Applications



Application Processing Paths

Input Instances

Account Number	INPUT
	OUTPUT
P.O. Number	INPUT
	OUTPUT
Item Number	INPUT
	OUTPUT
Quantity	INPUT
	OUTPUT



Information
Captured
In Sequence

Input screen

- Programs Called
- Call Statements Issued
- Tables/Files Accessed
- How Accessed

Output screen

*Locate Business Logic
For Each Transaction*

*Identifies Which programs
... and Where in the programs to look*

PathPoint *Captures* Execution-Based Information

The Key to Understanding Application Performance

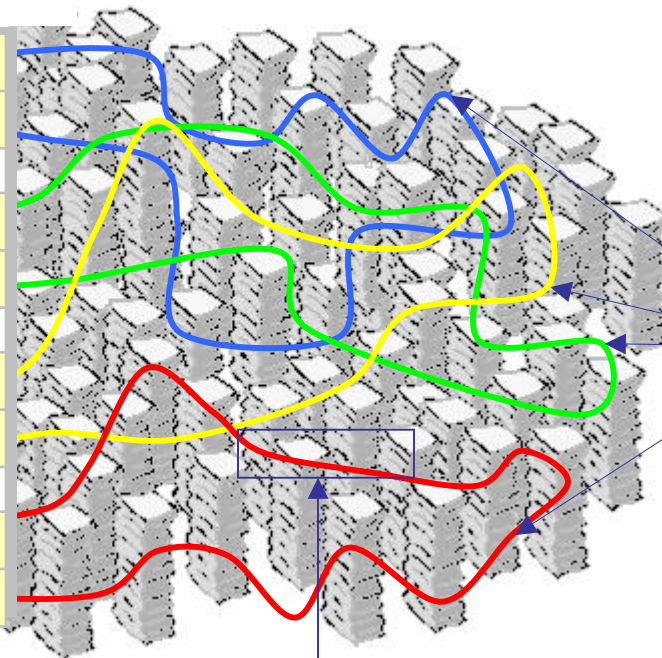
Enter New Order



Application Processing Paths

Input Instances

Account Number	INPUT
	OUTPUT
P.O. Number	INPUT
	OUTPUT
Item Number	INPUT
	OUTPUT
Quantity	INPUT
	OUTPUT



Application Performance Information

- Elapsed Time *Per Call Statement*
- Interim Time *Between Call Statements*
- Frequency *Of Call Statements*

Features for the Application Analyst

*Identifies Which programs
... and Where in the programs to look*

PathPoint *Captures* Execution-Based Information

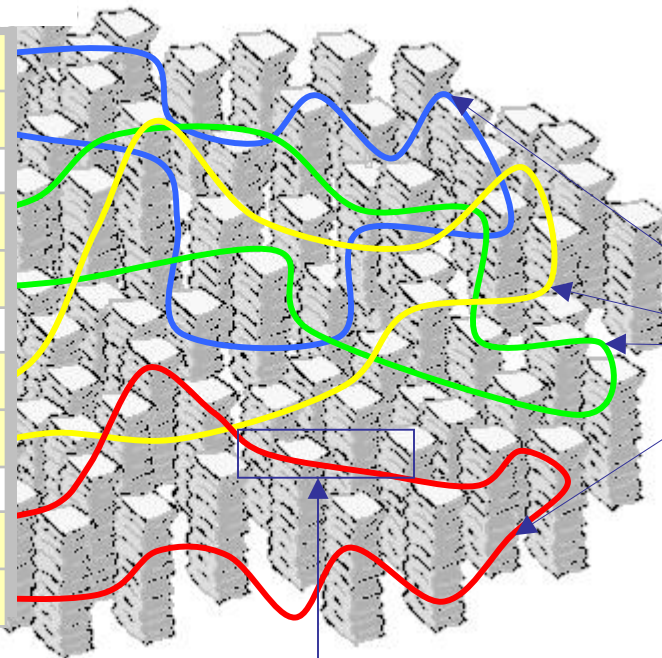
The Key to Discovering Business Rules



Application Processing Paths

Input Instances

Account Number	INPUT
	OUTPUT
P.O. Number	INPUT
	OUTPUT
Item Number	INPUT
	OUTPUT
Quantity	INPUT
	OUTPUT



Business Rules
Discovery

*Business Rules Can Be
Related to
Business Transactions*

*Locate Business Logic
For Each Transaction*

*Identifies Which programs
... and Where in the programs to look*

PathPoint PC Workstation

Finding The Right Code With Easy Point & Click Access



Input Instances

<input type="checkbox"/>	60 OE03 - ACCOUNT NUMBER
<input type="checkbox"/>	61 OE04 - P.O. NUMBER
<input type="checkbox"/>	62 OE04 - ITEM NUMBER
<input type="checkbox"/>	63 OE05 - QUANTITY

Menu Options

- Show Statements
- Show Tables/Files
- Show Columns
- Show Transactions/Job Steps
- Show Programs
- Show Call Paths/Patterns
- Show Performance Detail
- Show Performance Summary
- Show User Screens
- Report Input Instance Overview
- Check Application Objects
- Uncheck Application Objects
- Check Business Objects

Call Statements Issued on Call Path

Pgm/Pkg	Stmnt #	Statement
OPC0005C	1642	SELECT FRONTLIST_QUANTITY INTO :HV-DA-TOPDISCOUN
OPC0005C	1655	INSERT INTO TOPDISCOUNTACCUM (ORDER_NUMBER , G
OPC0005C	1786	SELECT COMBIN_BL_NEW_IND , DISC_ACCUM_CODE , FR
OPC0005C	1804	INSERT INTO TOPDISCOUNTACCUM (ORDER_NUMBER , G
OPC0005C	1937	UPDATE TOPDISCOUNTACCUM SET FRONTLIST_QUANTITY
OPC0005C	1967	UPDATE TOPDISCOUNTACCUM SET FRONTLIST_QUANTITY

Tables/Files Accessed by Statements on Call Path

Table/File Name	Identifier	C	R	U	D	Total
TOPACCOUNTSCHEDULE	DVT2		1			1
TOPBOOKORDHEADER	DVT2		1			1
TOPCOTIMPRINTPFL	DVT2		1			1
TOPDISCOUNTACCUM	DVT2	2	2	2		6
TOPDISCOUNTMATRIX	DVT2		1			1
TOPFACILITYID	DVT2		1			1

```

OE05                                BOOKS R US                                07/24/02
UNIVERSAL ORDER PROCESSING SYSTEM    11:31:07
ORDER DETAIL - ENTRY

ACCOUNT 0321017-00000 THE WRITE APPROACH                                ORD CTL NO
                                                                007229687

LINE  QTY  ISBN      DESCRIPTION          FAC LS TY  PRICE  DISC STA BAL/DUE
ITEM  -----
1     1002  0740700553  GB A CHRISTMAS ALPHA  BRS   BH   4.95  50.0  AS

ITEM  QTY  TITLE          ISBN      PROMO          NET          SAV
0002  -----
TITLE:          AUTH:          SERIES:        SUBJ:          B/O
PF2=FWD 3=BWD 5=FIX HDR 6=TTL LKUP 7=EXIT 9=BAL 10=MULT TTL 12=PROMO 24=CHG DSP
    
```

The PathPoint Dynamic Approach

An Input Instance - Quantity

What Happened?



Input Instance

Quantity	3
Unit of Measure	Each
List Price	\$1,589.00
Unit Discounted Price	\$1,367.14
Extended Price	\$4,101.42
Requested Ship Date	08/15/05

INPUT



OUTPUT

Input Instance - Quantity

Captured Call Path Information (DB2) – Process View

Sequence Number	CICS System/Trans	Program Name	Call Stmt Number	Call Statements	Status Code	Response Time	Interim Time	
Seq	Subsystem	Trans/Step	Pgm/Pkg	Stmt #	Statement ‡	Status	Resp †	Interim †
1	CTVB	OE05	CICS		CALL OPOE005C (INIT) IN CO2 ←		0.000000	0.005117
2	CTVB	OE05	OPOE005C	10452	SELECT ORDER_STATUS_CODE INTO :WORK-FETCH.WK-ORDER-STAT	100	0.001151	0.007457
3	CTVB	OE05	OPOE005C	10459	SELECT ORDER_STATUS_CODE INTO :WORK-FETCH.WK-ORDER-STAT	0	0.000803	0.003816
4	CTVB	OE05	OPOE005C	x'192D6'	CALL OPCO0200 (LINK) IN CO2 ←		0.000000	0.003344
5	CTVB	OE05	OPCO0200	993	OPEN ISBN-CURSOR	0	0.004950	0.002917
6	CTVB	OE05	OPCO0200	1026	FETCH ISBN-CURSOR INTO :HV-PROD-TOPPRODUCT.HV-PROD-PRODU	0	0.000627	0.091028
7	CTVB	OE05	OPCO0200	1015	CLOSE ISBN-CURSOR	0	0.000319	0.003440
8	CTVB	OE05	OPOE005C	13254	SELECT GROUP_NUMBER , BO_RELEASE_METHOD , MAX_DISCOUNT	0	0.000757	0.005637
9	CTVB	OE05	OPOE005C	13113	SELECT ACCOUNT_NUMBER , GROUP_NUMBER , ACCOUNT_CLASS ,	0	0.000777	0.003461
10	CTVB	OE05	OPOE005C	13201	SELECT ACCOUNT_NUMBER , GROUP_NUMBER , PUB_DIV_NUMBER ,	100	0.000770	0.004406
11	CTVB	OE05	OPOE005C	12743	OPEN PROMO-CURSOR	0	0.027012	0.004184
12	CTVB	OE05	OPOE005C	12752	FETCH PROMO-CURSOR INTO :PROMOTION-ACCOUNT-RECORD.PROM	0	0.000293	0.005264
13	CTVB	OE05	OPOE005C	12773	CLOSE PROMO-CURSOR	0	0.000327	0.003508
14	CTVB	OE05	OPOE005C	8136	SELECT PROMOTION_STATUS , PROMOTION_TYPE , PROMO_DESCRIP	0	0.000779	0.005354
15	CTVB	OE05	OPOE005C	8213	SELECT PROMOTION_KEY , ORDER_NUMBER , ACCOUNT_NUMBER , :	100	0.000739	0.004891
16	CTVB	OE05	OPOE005C	12114	SELECT COUNT (*) INTO :WS-DATA-COUNT FROM TOPPROMOACCOU	0	0.000632	0.003916
17	CTVB	OE05	OPOE005C	14084	OPEN PROMO-PRODS	0	0.001305	0.003501
18	CTVB	OE05	OPOE005C	14088	FETCH PROMO-PRODS INTO :PROMOTION-PRODUCT-RECORD.ISBN , :	0	0.000241	0.003426
19	CTVB	OE05	OPOE005C	14099	CLOSE PROMO-PRODS	0	0.000319	0.003390
20	CTVB	OE05	OPOE005C	14121	SELECT PUB_DATE_TO INTO :PROMOTION-RECORD.PUB-DATE-TO FRO	0	0.000678	0.046248
21	CTVB	OE05	OPOE005C	14041	SELECT PRIMARY_SERV_CNTR INTO :WS-SERVICE-CENTER FROM TC	0	0.005078	0.004252
22	CTVB	OE05	OPOE005C	14239	SELECT DISC_NET_PRINT_IND , FREIGHT_TERMS_CODE , BO_TIME_LI	100	0.000602	0.004192
23	CTVB	OE05	OPOE005C	x'1ECBC'	CALL OPCO0150 (LINK) IN CO2 ←		0.000000	0.003449
24	CTVB	OE05	OPCO110B	301	SELECT PACK_QTY INTO :HV-FIELDS.HV-PACK-QUANTITY FROM TOPI	0	0.000774	0.004431
25	CTVB	OE05	OPOE005C	x'1F050'	CALL OPCO0050 (LINK) IN CO2 ←		0.000000	0.003498

Input Instance - Quantity

Files and Columns Accessed in Call Path – Data View

Files Accessed

Type	Table/File Name ‡	Identifier	C ‡	R ‡	U ‡	D ‡	Total
DB2	TOPACCOUNTSCHEDULE	DVT2		1			1
DB2	TOPBOOKORDHEADER	DVT2		1			1
DB2	TOPCOTIMPRINTPFL	DVT2		1			1
▶ DB2	TOPDISCOUNTACCUM	DVT2	2	2	2		6
DB2	TOPDISCOUNTMATRIX	DVT2		1			1
DB2	TOPFACILITYID	DVT2		1			1
DB2	TOPFPBACKLOG	DVT2			1		1
DB2	TOPGROUPPROFILE	DVT2		1			1
DB2	TOPGRPACCTPRFL	DVT2		1			1
DB2	TOPIISBNPACKTYP	DVT2		1			1
DB2	TOPPDACCTPRFL	DVT2		1			1
DB2	TOPPRBKLINEITEM	DVT2		1			1
DB2	TOPPRBKORDHEADER	DVT2		1			1

Columns Accessed

File Type	Table/File ‡	Name ‡	Identifier	C ‡	R ‡	U ‡	D ‡	All Stmts
DB2	TOPDISCOUNTACCUM	ACCOUNT_NUMBER	DVT2	2				6
DB2	TOPDISCOUNTACCUM	BACKLIST_QUANTITY	DVT2	1	1	1		3
▶ DB2	TOPDISCOUNTACCUM	COMBIN_BL_NEW_IND	DVT2	1	1			2
DB2	TOPDISCOUNTACCUM	DISC_ACCUM_CODE	DVT2	2	1			3
DB2	TOPDISCOUNTACCUM	DISC_SCHEDULE_CODE	DVT2	2				6
DB2	TOPDISCOUNTACCUM	FRONTLIST_QUANTITY	DVT2	2	2	2		6
DB2	TOPDISCOUNTACCUM	GROUP_NUMBER	DVT2	2				6
DB2	TOPDISCOUNTACCUM	ORDER_NUMBER	DVT2	2				6

Call Statements Accessing a Specific File

Inst #	Pgm/Pkg	Stmt #	Statement ‡
▶ +	63 OPC00050	1642	SELECT FRONTLIST_QUANTITY INTO :HV-DA-TOPDISCOUNTACCUM.F
+	63 OPC00050	1655	INSERT INTO TOPDISCOUNTACCUM (ORDER_NUMBER , GROUP_NU
+	63 OPC00050	1786	SELECT COMBIN_BL_NEW_IND , DISC_ACCUM_CODE , FRONTLIST_I
+	63 OPC00050	1804	INSERT INTO TOPDISCOUNTACCUM (ORDER_NUMBER , GROUP_NU
+	63 OPC00050	1937	UPDATE TOPDISCOUNTACCUM SET FRONTLIST_QUANTITY = :HV-DA
+	63 OPC00050	1967	UPDATE TOPDISCOUNTACCUM SET FRONTLIST_QUANTITY = :WS-V



The Next Step: Identify the Right Source Code

Leverage The Call Path

PathPoint Guided Investigation

PathPoint Automated Investigation

Option 1: PathPoint Guided Investigation

Call Path Provides Guidance

PathPoint

The Right Code



Program OP00050

Pgm/Pkg	Stmt #	Statement
CICS		CALL OPOE005C (INIT) IN CO2
OPOE005C	10452	SELECT ORDER_STATUS_CODE INTO :WORK-FETCH
OPOE005C	10459	SELECT ORDER_STATUS_CODE INTO :WORK-FETCH
OPOE005C	x*192D6	CALL OPC00200 (LINK) IN CO2
OPC00200	993	OPEN ISBN-CURS0R
OPC00200	1026	FETCH ISBN-CURS0R INTO :HV-PROD-TOPPRODUCT
OPC00200	1015	CLOSE ISBN-CURS0R
OPOE005C	13254	SELECT GROUP_NUMBER , BO_RELEASE_METHOD
OPOE005C	13113	SELECT ACCOUNT_NUMBER , GROUP_NUMBER , AC
OPOE005C	13201	SELECT ACCOUNT_NUMBER , GROUP_NUMBER , PU
OPOE005C	12743	OPEN PROMO-CURS0R
OPOE005C	12752	FETCH PROMO-CURS0R INTO :PROMOTION-ACCOU
OPOE005C	12773	CLOSE PROMO-CURS0R
OPOE005C	8136	SELECT PROMOTION_STATUS , PROMOTION_TYPE
OPOE005C	8213	SELECT PROMOTION_KEY , ORDER_NUMBER , ACC
OPOE005C	12114	SELECT COUNT (*) INTO :WS-DATA-COUNT FROM T
OPOE005C	14084	OPEN PROMO-PRODS
OPOE005C	14088	FETCH PROMO-PRODS INTO :PROMOTION-PRODUC
OPOE005C	14099	CLOSE PROMO-PRODS
OPOE005C	14121	SELECT PUB_DATE_TO INTO :PROMOTION-RECORD
OPOE005C	14041	SELECT PRIMARY_SERV_CNTR INTO :WS-SERVICE-
OPOE005C	14239	SELECT DISC_NET_PRINT_IND , FREIGHT_TERMS_C
OPOE005C	x*1ECBC	CALL OPC00150 (LINK) IN CO2
OPC0110B	301	SELECT PACK_QTY INTO :HV-FIELDS.HV-PACK-QUA
OPOE005C	x*1E950	CALL OPC00050 (LINK) IN CO2
OPC00050	1642	SELECT FRONTLIST_QUANTITY INTO :HV-DA-TOP
OPC00050	1655	INSERT INTO TOPDISCOUNTACCUM (ORDER_NU
OPC00050	2069	SELECT EDITION_CODE INTO :WS-EDITION-CODE
OPC00050	2099	SELECT DISCOUNT_PERCENT , FREIGHT_TERMS
OPC00050	1744	SELECT DISCOUNT_PERCENT , SCHEDULE , FRI
OPC00050	1786	SELECT COMBIN_BL_NEW_IND , DISC_ACCUM (
OPC00050	1804	INSERT INTO TOPDISCOUNTACCUM (ORDER_NU
OPC00050	1937	UPDATE TOPDISCOUNTACCUM SET FRONTLIST
OPC00050	1967	UPDATE TOPDISCOUNTACCUM SET FRONTLIST

```

1782 40000-DB2-READ.
1783 MOVE W-LINE-ITEM TO HV-BLI-TOPBOOKLINEITEM .
1784 MOVE W-DISCOUNT TO HV-DSMX-TOPDISCOUNTMATRIX.
1785 EXEC SQL
1786 SELECT COMBIN_BL_NEW_IND , DISC_ACCUM CODE
1787 ORD_DISC_PREF_IND , COMBIN_BL_NEW_IND
1788 FROM TOPDISCOUNTMATRIX
1789 WHERE GROUP_NUMBER = :HV-BLI-TOPBOOKLINEITEM
1790 AND ACCT_DISC_CLASS = :HV-DSMX-TOPDISCOUNTMATRIX
1791 AND TITLE_PRICING_CODE = :HV-DSMX-TOPDISCOUNTMATRIX
1792 END-EXEC.

1803 EXEC SQL
1804 INSERT INTO TOPDISCOUNTACCMM ( ORDER_NUMBER , GROUP_NUM)
1805 SET FRONTLIST_QUANTITY = :HV-DA-TOPDISCOUNTACCUM ,
1806 BACKLIST_QUANTITY = :HV-DA-TOPDISCOUNTACCUM
1807 WHERE ACCOUNT_NUMBER = :HV-BLI-TOPBOOKLINEITEM
1808 AND ORDER_NUMBER = :HV-BLI-TOPBOOKLINEITEM
1809 AND GROUP_NUMBER = :HV-BLI-TOPBOOKLINEITEM
1810 AND DISC_SCHEDULE_CODE = :HV-DSMX-TOPDISCOUNTMATRIX
1811 END-EXEC.
    
```

Application Logic

Examine Code Detail

Call Statement Path

Option 2: PathPoint Automated Investigation

Display the Possible Source Code Conditions

PathPoint

OPC00050	1642	SELECT FRONTLIST_QUANTITY INTO :HV-DA-TOP
OPC00050	1655	INSERT INTO TOPDISCOUNTACCUM (ORDER_NU
OPC00050	2069	SELECT EDITION_CODE INTO :WS-EDITION-CODE
OPC00050	2099	SELECT DISCOUNT_PERCENT , FREIGHT_TERMS
OPC00050	1744	SELECT DISCOUNT_PERCENT , SCHEDULE , FRI
OPC00050	1786	SELECT COMBIN BL NEW IND , DISC ACCUM C

The Right Code



Program OP00050

Condition 1

Condition 2

#Paths	Path	Seq	Paragraph	Stmt #	Function	Description
2	1	1	MC1-20	2136	IF	SQLCODE = +100
2	1	2	MC1-20	2142	GOTO	MC1-VAL
2	1	3	MC1-VAL	2218	PERFORM	DSN8MC3 THRU END-DSN8MC3
2	2	1	MC1-20	2162	IF	ENDBIT NOT = ON-1
2	2	2	MC1-20	2162	GOTO	MC1-30
2	2	3	MC1-30	2193	IF	ACTION IN INAREA NOT = ACTION IN OUTARE
2	2	4	MC1-30	2196	GOTO	MC1-VAL
2	2	5	MC1-VAL	2218	PERFORM	DSN8MC3 THRU END-DSN8MC3

Conditional Logic

OPC00050	1804	INSERT INTO TOPDISCOUNTACCUM (ORDER_NU
OPC00050	1937	UPDATE TOPDISCOUNTACCUM SET FRONTLIST
OPC00050	1967	UPDATE TOPDISCOUNTACCUM SET FRONTLIST

Call Statement Path

PathPoint Value Proposition

Understand How Your Mainframe Applications Really Work

Make Decisions Based Upon Execution-Based Fact

- *Which programs are involved*
- *Where in the programs to make changes*

Managing the Present

- *Change Requests*
- *Problem Determination*
- *Performance Assessment*

Building for the Future

- *SOA*
- *Transformation/Modernization*
- *Componentization*



**The Right
Code**

Reduce Project Time, Resources and Cost