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Rational Developer for System z (RDz) at Nationwide

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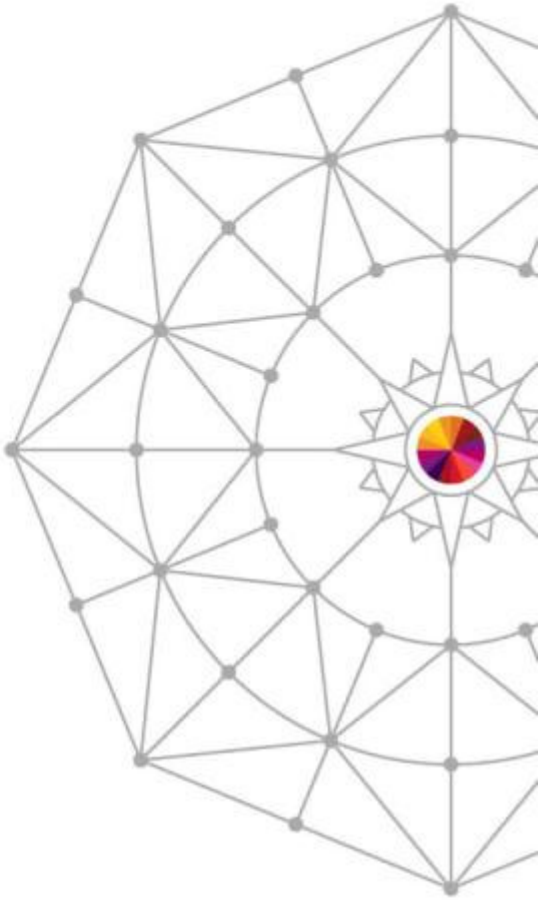
Nationwide Mutual Insurance Company

Wednesday, March 12, 2014
4:30pm
Session Number 14970



Nationwide®

SHARE in Anaheim

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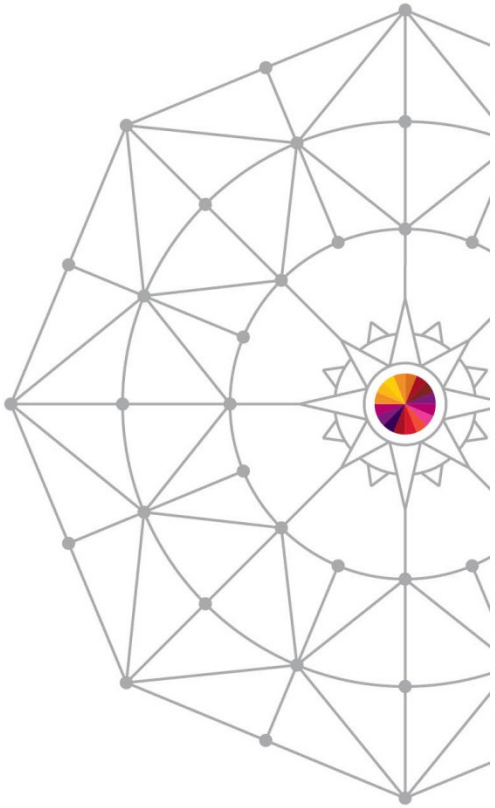
Purpose

- Purpose
  - SHARE experience with adopting RDz as the toolset of choice for mainframe access, application analysis, development, testing & deployment of code at Nationwide
  - Demonstrate a life-like scenario of using the RDz toolset and plug-ins

Complete your session evaluations online at www.SHARE.org/Anaheim-Eval

Agenda

- Agenda
  - Who is Nationwide
    - A little about me
  - IT at Nationwide
  - System z at Nationwide
  - RDz Drivers
  - RDz Roadmap
  - RDz Adoption Challenges
  - RDz Adoption Helpers
  - Who is using and what they have to say
  - DEMO



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Who is Nationwide

- Financial institution
- Fortune 500 - #100
- Columbus, OH based
- 30,000 employees
- Companies (some)
  - Allied (Des Moines, IA)
  - Titan (Cleveland, OH)
  - Scottsdale (AZ)
  - Harleysville (PA)
- www.youtube.com/embed/ryNtVK55OUY

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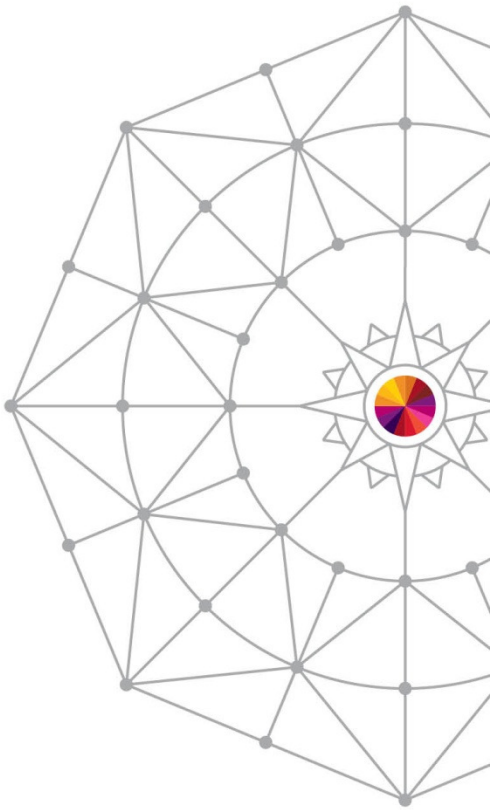
IT at Nationwide

- 5,000 IT Staff
- Organization
  - Application Development Center
    - CMMI Level 3
  - BSAs
- Agile Mindset
- Lean practices
- Embraced DevOps



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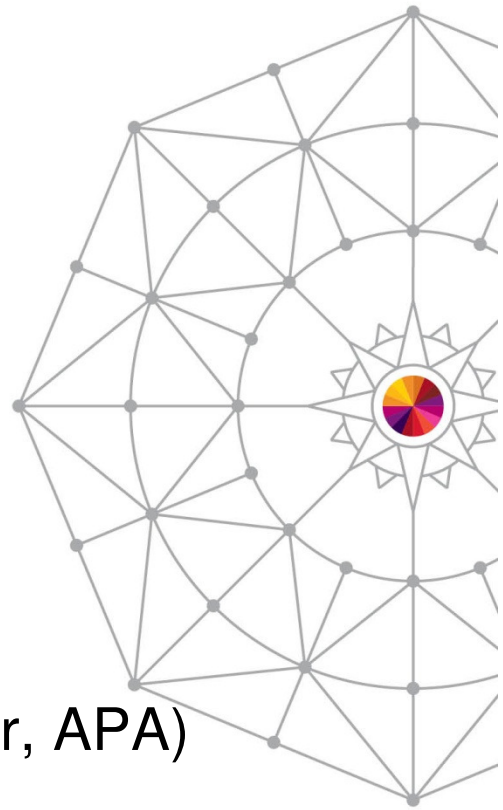
System z at Nationwide

- Staff
  - 300 Mainframe Developers
  - 70 Mainframe System Engineers
- Some of the technologies
  - z196 / zOS 2.1
  - DB2, IMS
  - SERENA ChangeMan
  - CICS, MQ
  - PDTools (Debug, Fault Analyzer, File Manager, APA)
  - COBOL, Java, XML, C++, Fortran, PL/I
  - z/Linux
- Multiple Data Centers, Servers, LPARs



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RDz Drivers

Nationwide's mainframe development capability is being impacted by:

Staffing:

- Need a modernized approach to COBOL development to attract wider pool of skilled development resources

Productivity:

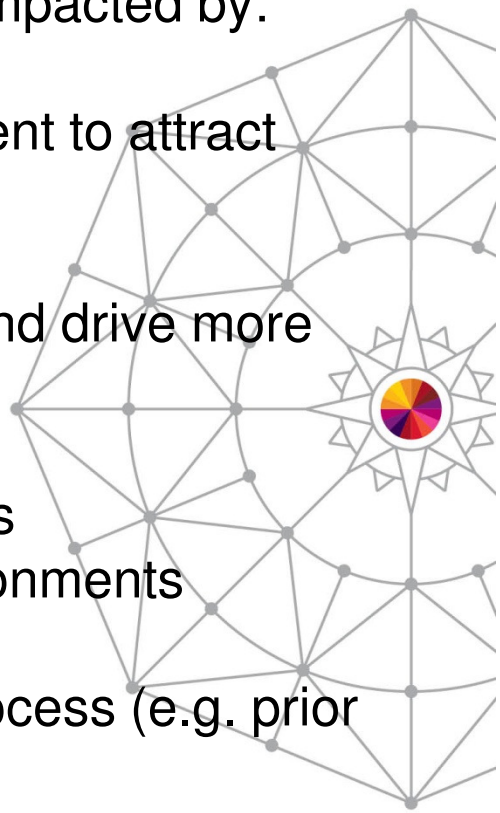
- Lack of a robust IDE to find problems (e.g. syntax) and drive more productive software development
- Too many develop/compile/test cycles
- Too much involvement of developers in testing cycles
- Wait states in testing due to contention for test environments

Quality:

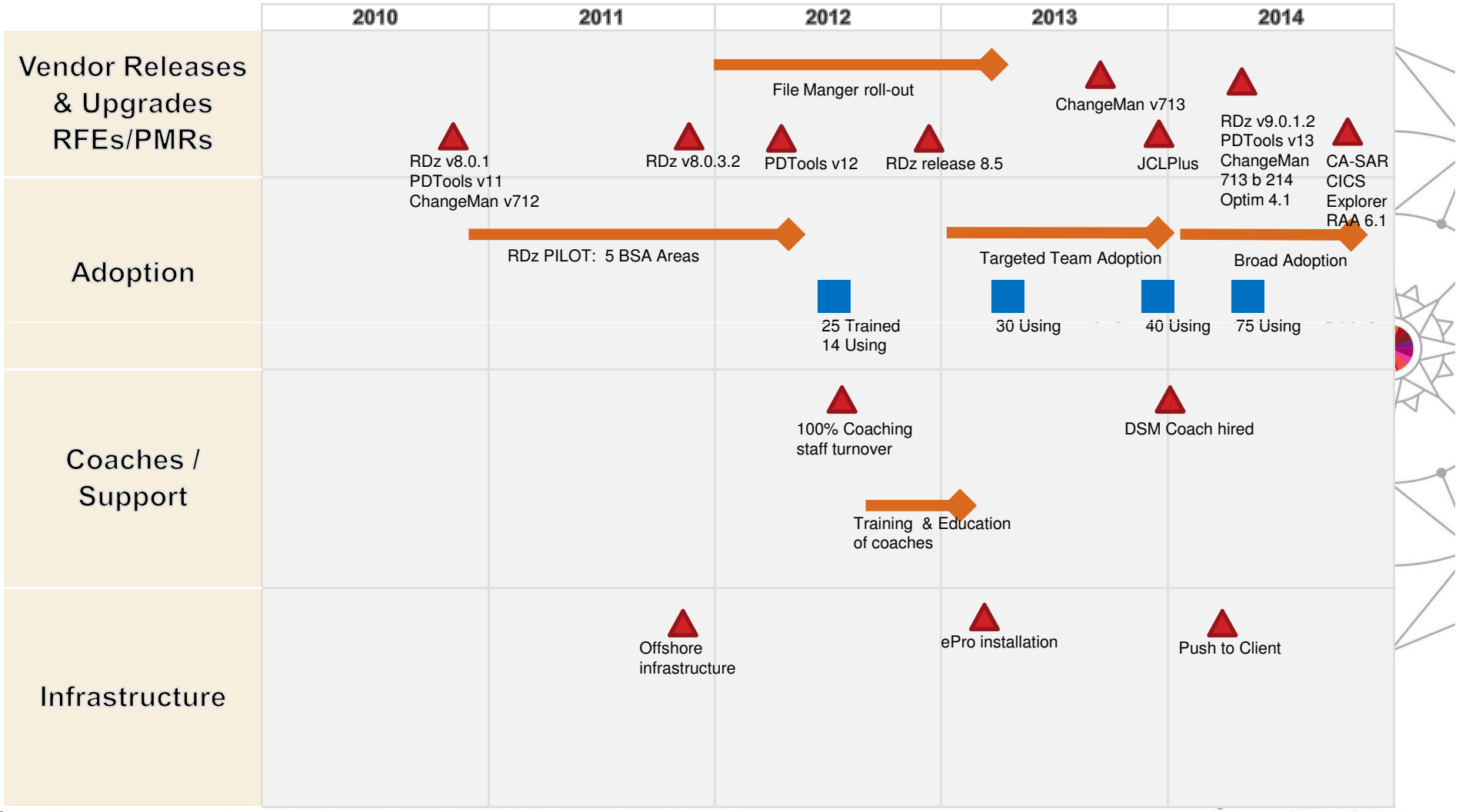
- Inability to find defects earlier in the development process (e.g. prior to a testing the entire system) which drives cost up
- Lack of automated testing capabilities which drives costs up

Costs:

- All of the above leading to higher costs for COBOL development



Nationwide's RDz Roadmap



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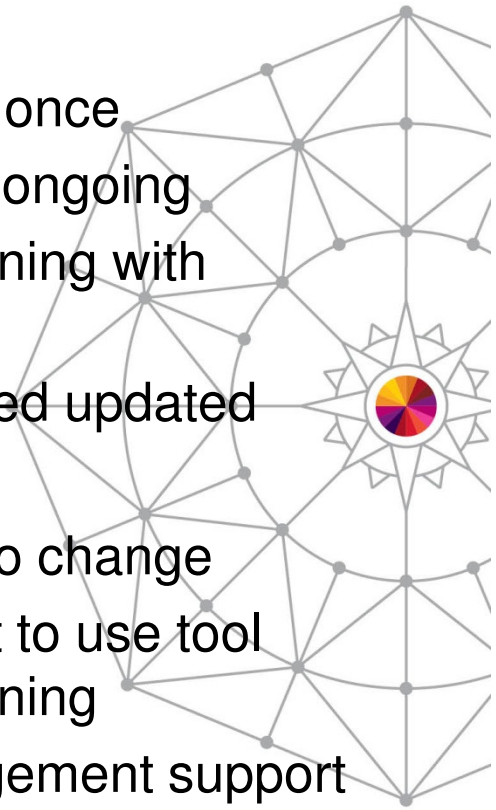
RDz Adoption Challenges

- Support
  - Coaching staff turnover
  - Lost DSM presence
  - Established SMEs moved off-platform
- Product maturity
  - Lack of plug-ins or functionality
  - Too many software updates
  - Install/set-up process
  - Performance
  - “Buggy”
- Training
  - Too much at once
  - Needs to be ongoing
  - Balance learning with delivery
  - Materials need updated
- Mindset
  - Resistance to change
  - Commitment to use tool following training
  - Need management support
  - Pilot groups didn’t understand expectations



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RDz Adoption Helpers

- FREE RDz Training (now through Royal Cyber)
- Online resources – IBM Education Assistant, You Tube
- Vendor – Response time to questions or issues
- Catalysts – Thought leaders / SMEs
- License – Covered under ELA
- Collaboration (internal & external) – SPOT / Wiki / Yammer / User Group / DPP / developerWorks
- Mainframe Community of Practice (MCoP)
- Coaches offering on boarding guidance and tool support
- Management support

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Who is using RDz and what they have to say

- "As we move forward with technology, RDz provides all the necessary improvements to continue to make mainframe and distributed work more cohesive and capable. The positives far outweigh the negatives." –Russ Penning, COBOL Modernization Coach
- From Pramit Gupta, Developer:
  - "The RDz Tool is a great chill out away from the Green Font on Black screen"
  - "Using the RDz Tool is a small step towards giant leap of Cobol/Mainframe Modernization at Nationwide"
  - "RDz Tool creates enthusiasm among non-mainframers to learn Mainframe coding and easy to teach because of its UI based features."
- "I use RDz extensively for code analysis, code walk thru and code compare." – Srikanth Loganathan", Technical Lead
- "RDz makes an excellent tool for the systems programmer and new systems programmers are able to be more productive much faster with RDz." - Sandra Carroll, System Engineer
- I seldom change or write programs, however I'm always running RDz on my laptop for analytical purposes. When I want to know how an upstream change impacts our applications, RDz is my tool. When I'm looking to redesign and I improve our processes, RDz is my tool. Advanced search capabilities and all resources in a single view with no need to remember library names or locations of key resources. Using 3270 emulation against green screens would take 2 or 3 times longer for my tasks" Joe Elliott, Consulting Developer

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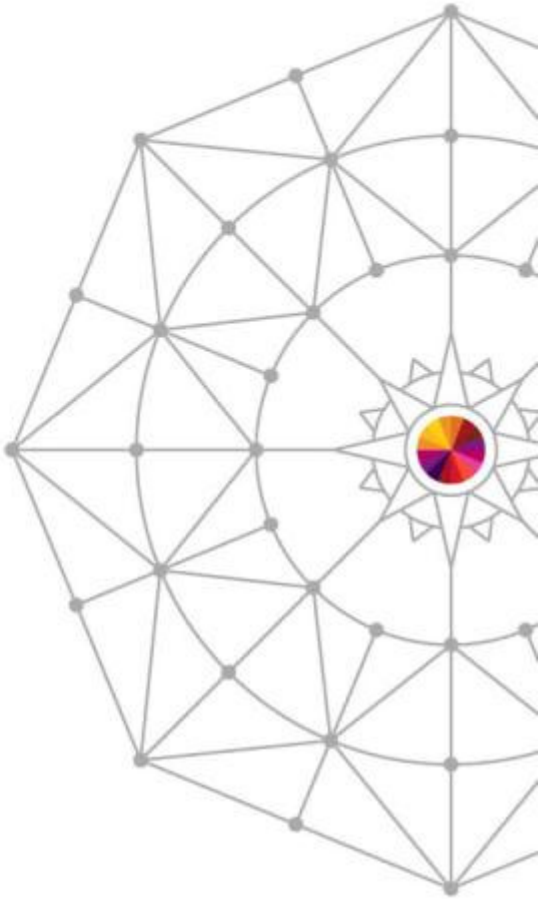
COBOL/Mainframe Modernization DEMO– RDz, PDTools, RAA

Prepared by: Kelly Cullimore



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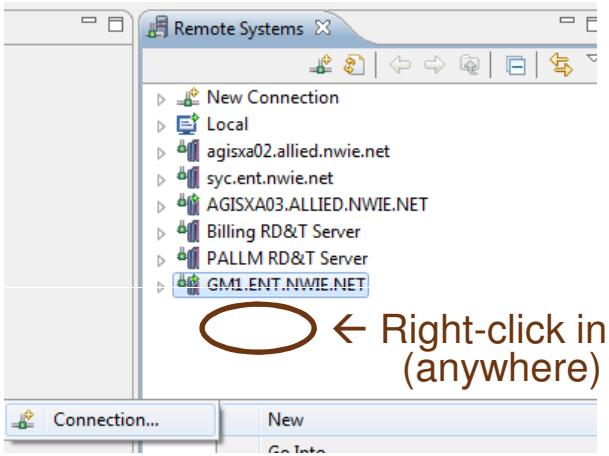
COBOL Mainframe Modernization - DEMO

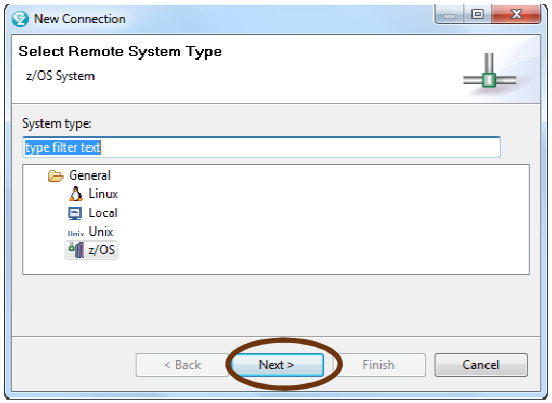
- Part 1: RDz Working CICS Transaction
- Part 2: The ABEND
- Part 3: Analysis
  - Fault Analyzer – where it happened (program)
  - Debug – why it happened (drill down)
- Part 4: The Fix
  - RAA – find a copybook for a file
  - File Manager – view/edit the file (fix bad data)
- Part 5: What if it requires a code change?
  - ChangeMan

Connect to Data Center West (Allied/DSM) System z

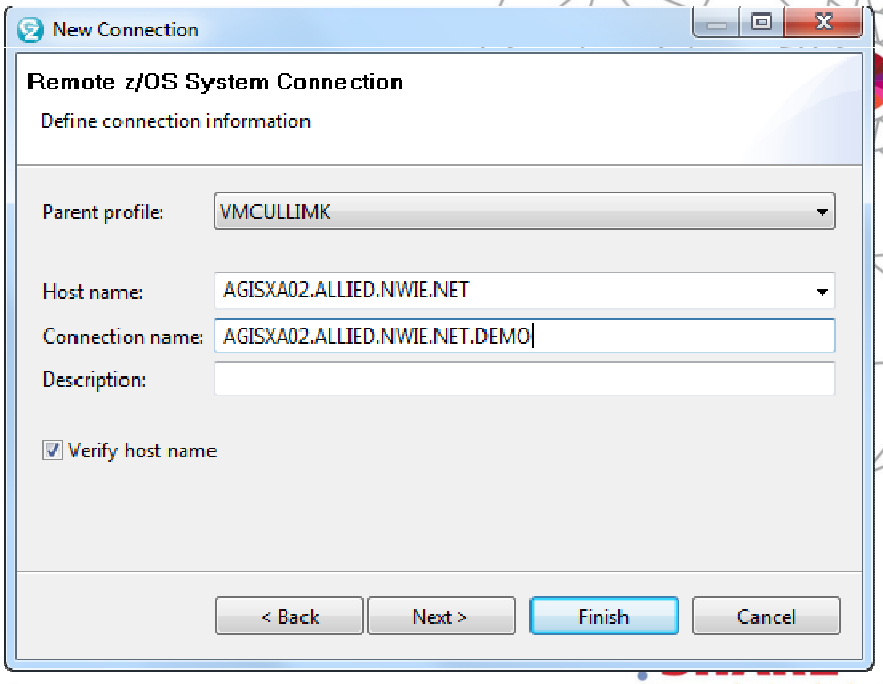
- Configure Connection (if not already there):
  - In the Remote Systems Explorer (RSE) view, right-click and select New…



- zOS should be selected – Click <Next>

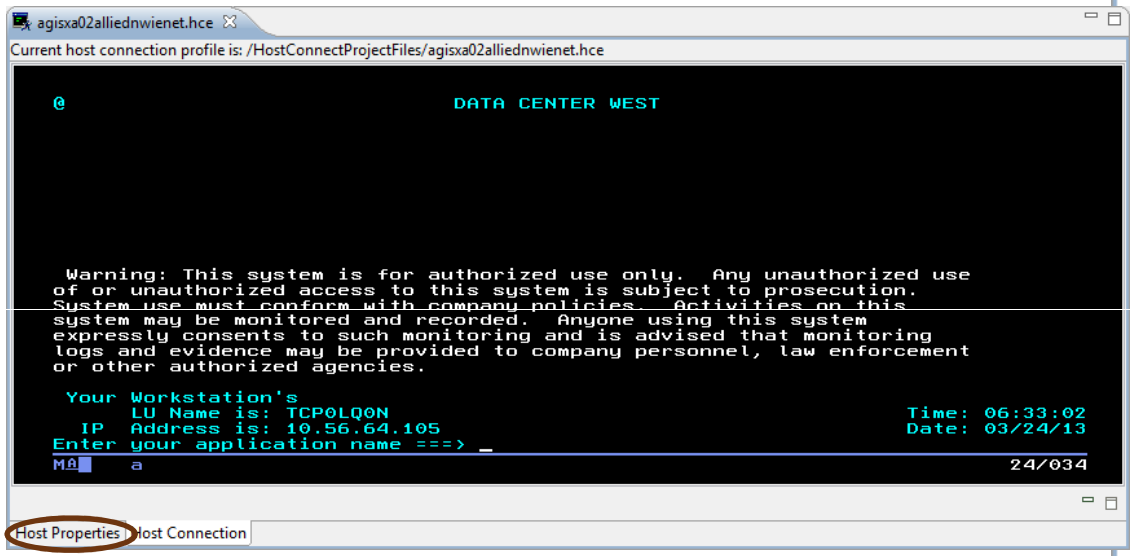


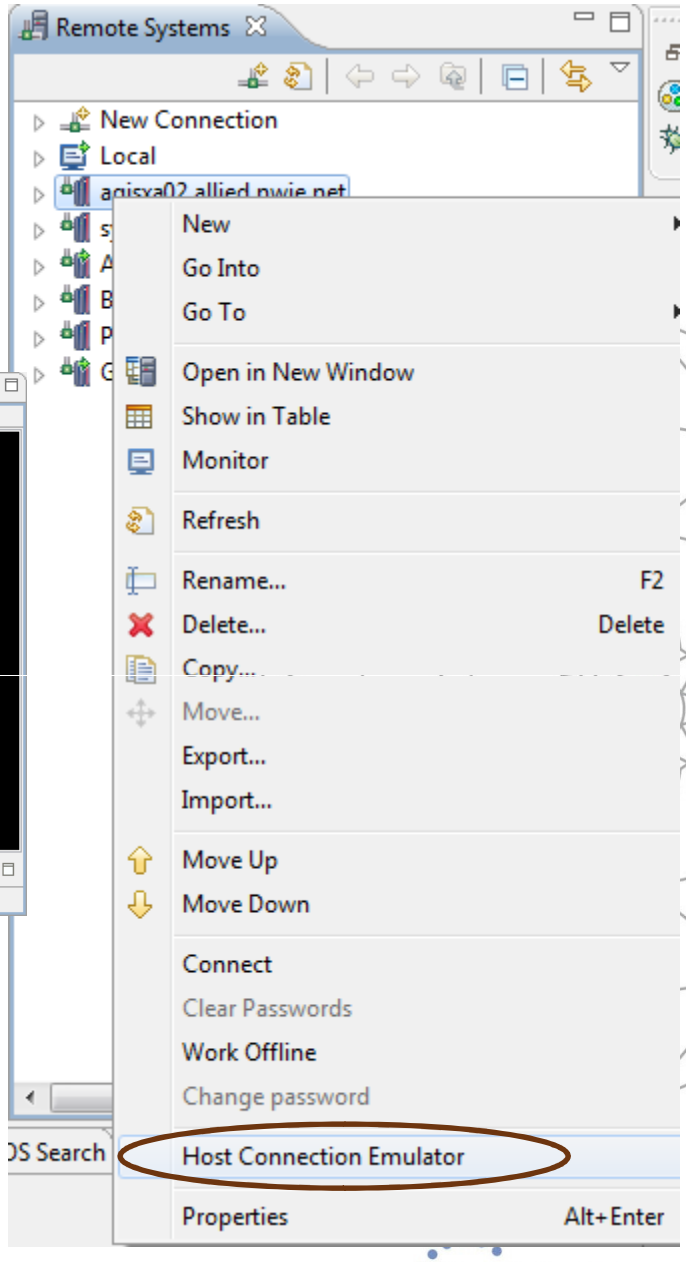
- Type Host name
- Type Connection Name (defaults to Host name, but can be whatever you want)
- Click <Finish>



Open Host emulator

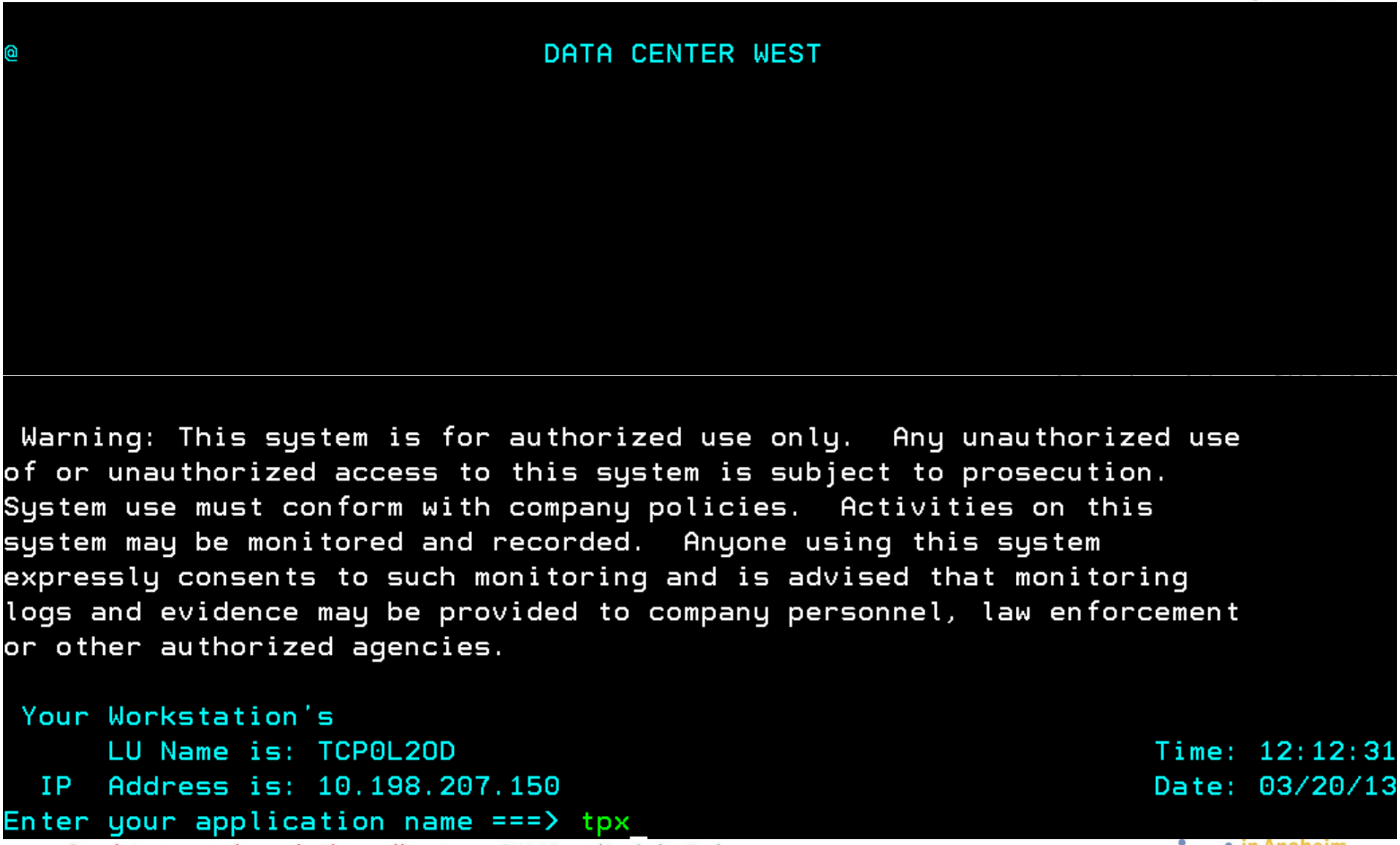
- Right-click the connection
- Select Host Connection Emulator





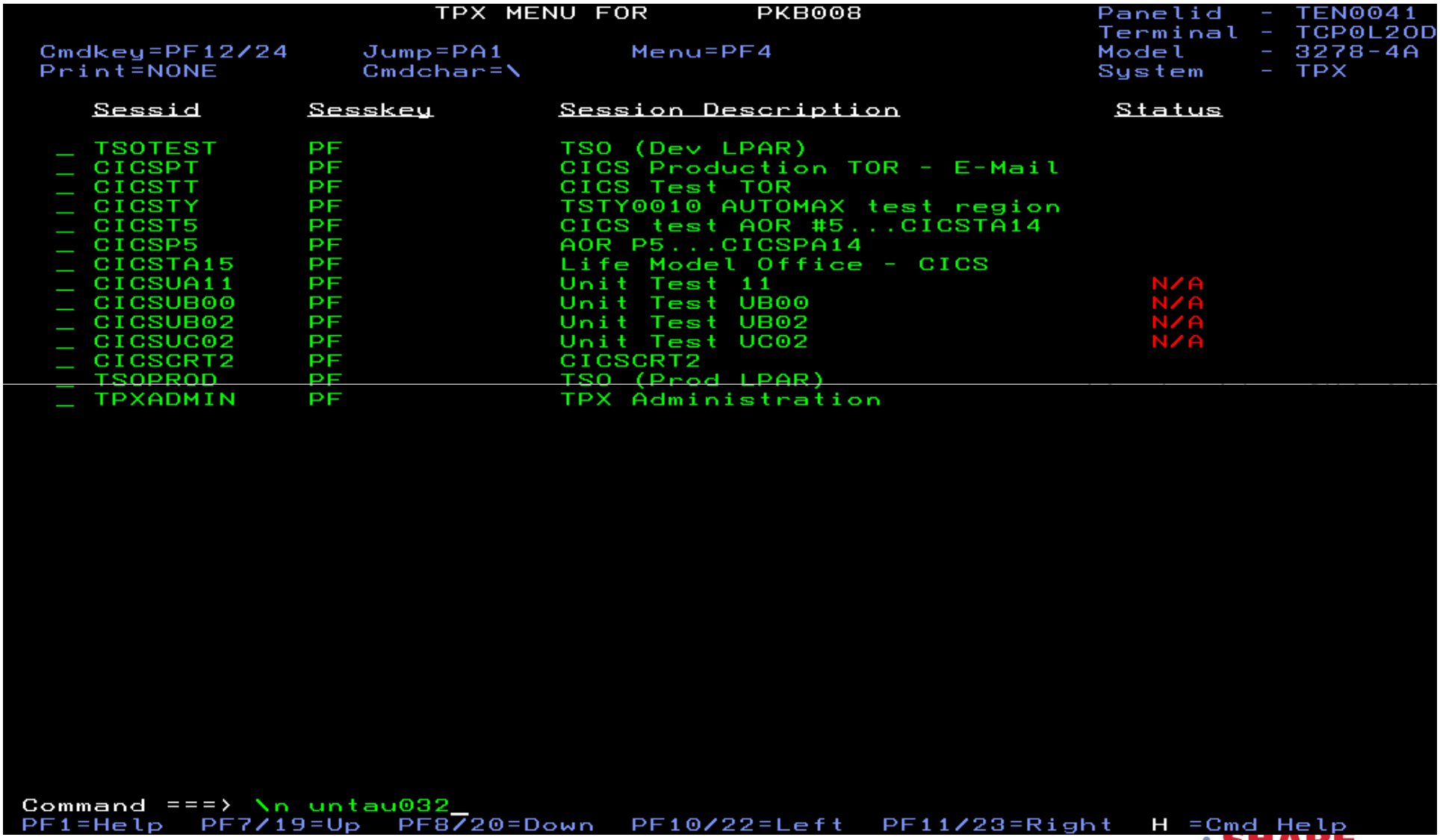
- Tip: Check the Host Properties and make sure screen size is 43x80

Sign on to Data Center West (Allied/DSM) System z

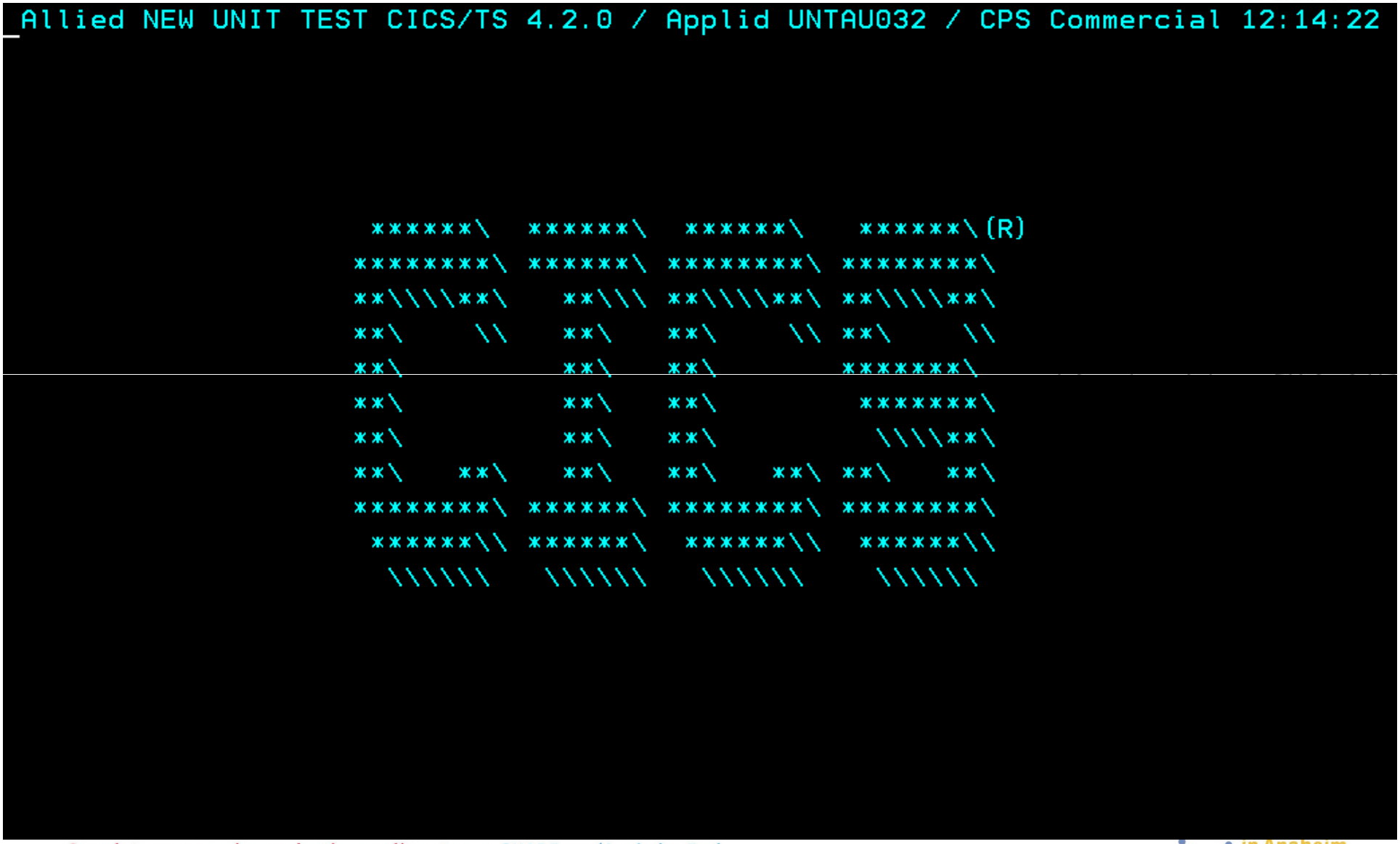


Log in to Data Center West (Allied/DSM) System z

Log on to test region



Pause (Break) to clear screen



CICS Sign-on command CESN

CICS Logon

```
                          Signon to CICS                        APPLID UNTAU032

Allied NEW UNIT TEST CICS/TS 4.2.0 / Applid UNTAU032 / CPS Commercial



Type your userid and password, then press ENTER:

        Userid . . . . pkb008__     Groupid . . . _________
        Password . . .
        Language . . . ___

     New Password . . .




DFHCE3520 Please type your userid.
F3=Exit
```

Commercial Farm Application – FM00 transaction

Farm System Menu Screen – Quote Inquiry

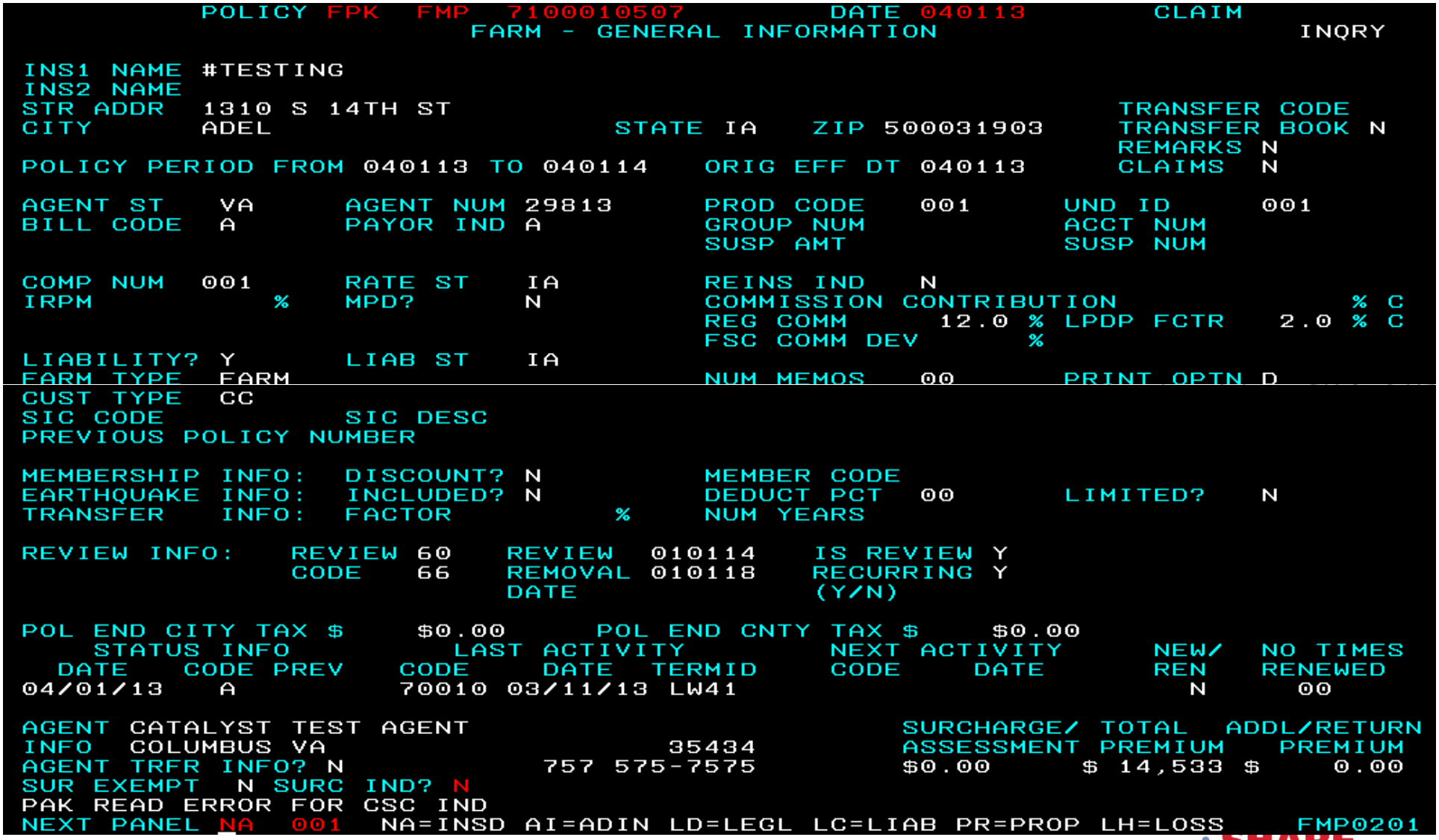
```
          POLICY                                  DATE                CLAIM
                              FARM SYSTEM MENU SCREEN

          ENTER POLICY INFORMATION: PKG PRFX fpk
                                    POL PRFX fmp
                                    POL NO   71 0 0010507
                                    EFF DATE 042013
                                DATE RECEIVED 032013
                             UND APPROVED DATE 032013
                                 PRINT OPTION
                               RETURN TO PAK? N
PLACE AN 'X' IN FRONT OF THE DESIRED TRANSACTION AND COMPLETE ALL ADDITIONAL
INFORMATION TO THE RIGHT, CORRESPONDING TO THE TRANSACTION.
            INQUIRY                 WORKSHEET
            QUOTE                   QUOTE INQUIRY x
          _ QUOTE UPDATE            WORKSHEET
            QUOTE TO POLICY
            POLICY TO QUOTE
            NEW BUSINESS
            MANUAL TO AUTOMATED
            RENEWAL
            AMENDMENTS              ADJ IND P
            CANCELLATION            ADJ IND    REASON     PRO RATA DATE
            REINSTATEMENTS                  COVERAGE REACTIVATION DATE
            REMOVE FOR MANUAL
            REPRINT FORMS           REPRINT TYPE
            REVIEW PENDING POLICIES/CHANGES
            UPDATE POLICY ON DATA ENTRY FILE
            REISSUE
            PREFIX TRANSFER
            SUMMARY OF AMENDMENTS

CANCEL REASONS                ADJ IND        REPRINT TYPES     PRINT OPTIONS
41 NONRENEWAL (UND)           P PRO RATE     N NEW BUSINESS    A ALL COPIES
42 MID-TERM CANCEL (UND)      S SHORT RATE   C CONVERSION      B INS & AGT COPY
43 NONRENEWAL                 F FLAT RATE    R RENEWAL         D ALL EXCEPT
44 CANCEL/REWRITE                            A AMENDMENT         CO COPY
45 NONPAYMENT                                B BLANK           N NO COPIES
46 INSURED'S REQUEST
47 LAPSE                       PRO RATA DATE: MUST BE ENTERED IF
48 MANAGEMENT DECISION         CANCEL REASON 45 OR 47 IS KEYED.

                                                                  FMP0101
```

Yeah!


POLICY FPK FMP 7100010507 DATE 040113 CLAIM
FARM - GENERAL INFORMATION INQRY
INS1 NAME #TESTING
INS2 NAME
STR ADDR 1310 S 14TH ST
CITY ADEL STATE IA ZIP 500031903
TRANSFER CODE
TRANSFER BOOK N
REMARKS N
CLAIMS N
POLICY PERIOD FROM 040113 TO 040114
ORIG EFF DT 040113
AGENT ST VA
AGENT NUM 29813
PROD CODE 001
UND ID 001
BILL CODE A
PAYOR IND A
GROUP NUM
ACCT NUM
SUSP AMT
SUSP NUM
COMP NUM 001
RATE ST IA
REINS IND N
IRPM %
MPD? N
COMMISSION CONTRIBUTION %
REG COMM 12.0 %
LPDP FCTR 2.0 %
FSC COMM DEV %
LIABILITY? Y
LIAB ST IA
FARM TYPE FARM
NUM MEMOS 00
PRINT OPTN D
CUST TYPE CC
SIC CODE
SIC DESC
PREVIOUS POLICY NUMBER
MEMBERSHIP INFO:
DISCOUNT? N
MEMBER CODE
EARTHQUAKE INFO:
INCLUDED? N
DEDUCT PCT 00
LIMITED? N
TRANSFER INFO:
FACTOR %
NUM YEARS
REVIEW INFO:
REVIEW 60
REVIEW 010114
IS REVIEW Y
CODE 66
REMOVAL 010118
RECURRING Y
DATE
(Y/N)
POL END CITY TAX $ $0.00
POL END CNTY TAX $ $0.00
STATUS INFO
LAST ACTIVITY
NEXT ACTIVITY
NEW/ REN
NO TIMES RENEWED
DATE CODE PREV
CODE DATE TERMID
CODE DATE
04/01/13 A
70010 03/11/13 LW41
N
00
AGENT CATALYST TEST AGENT
INFO COLUMBUS VA 35434
AGENT TRFR INFO? N 757 575-7575
SURCHARGE/ ASSESSMENT
TOTAL PREMIUM
ADDL/RETURN PREMIUM
$0.00
$ 14,533
$ 0.00
SUR EXEMPT N SURC IND? N
PAK READ ERROR FOR CSC IND
NEXT PANEL NA 001 NA=INSD AI=ADIN LD=LEGL LC=LIAB PR=PROP LH=LOSS
FMP0201

COBOL Mainframe Modernization - DEMO

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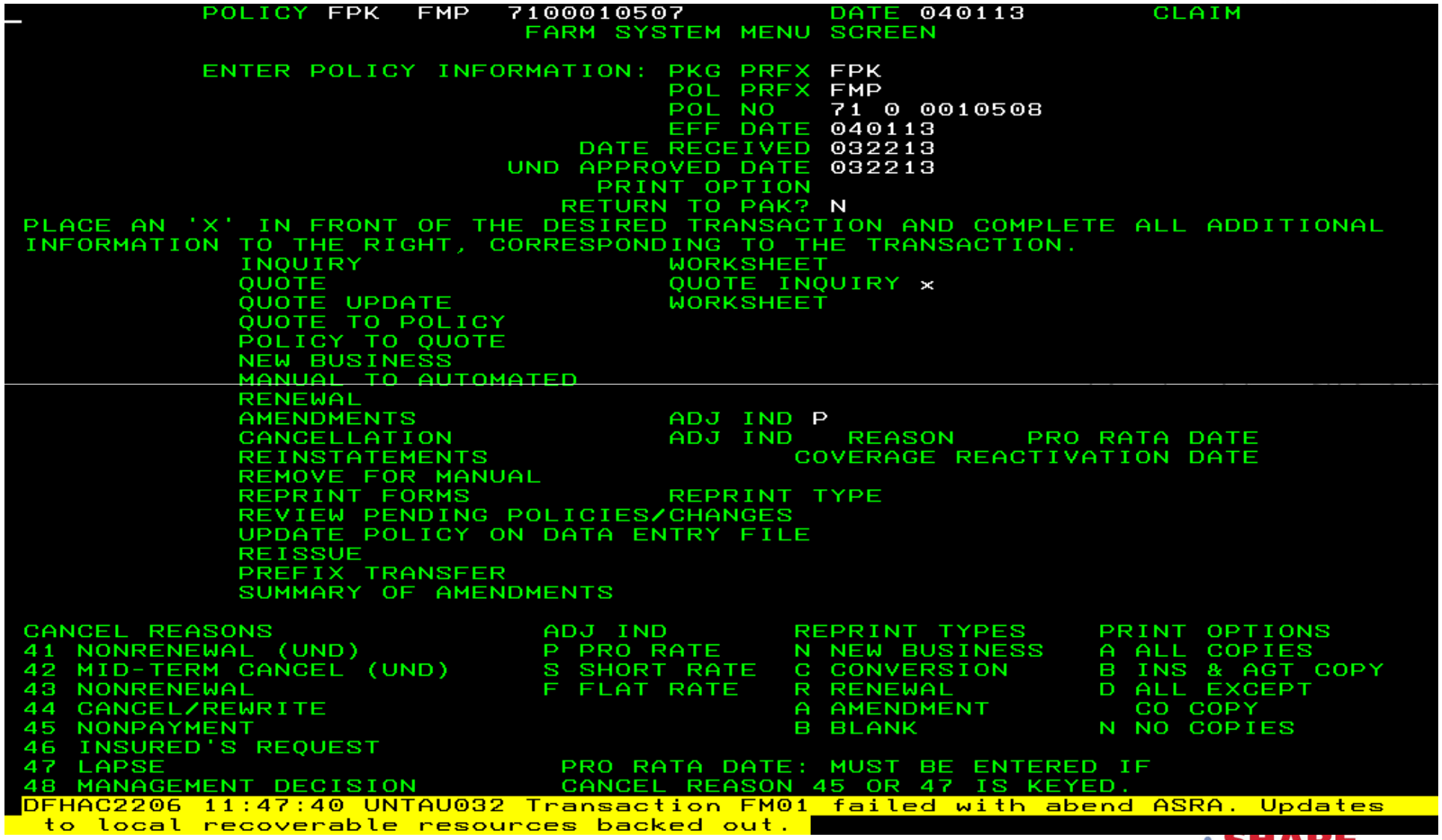
Abending transaction – FM00



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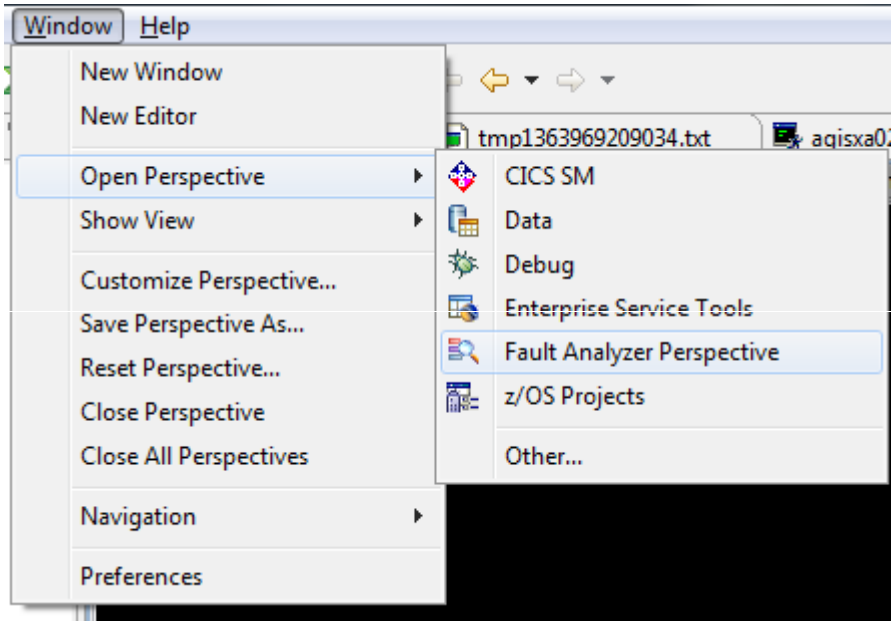
Fault Analyzer: Open the perspective

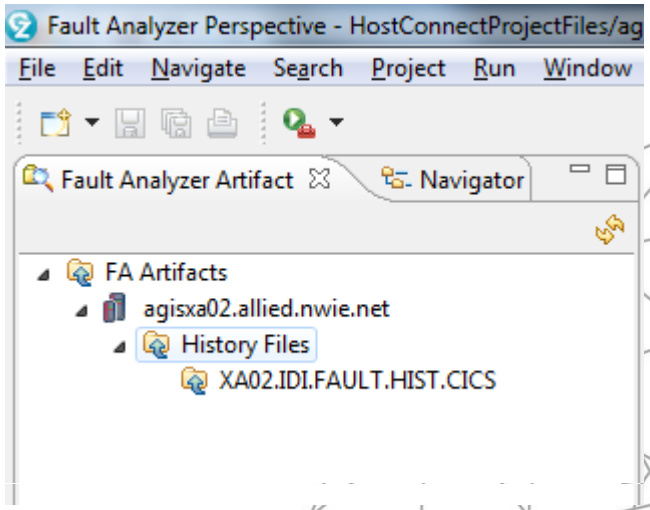
- Window → Open Perspective→ Fault Analyzer



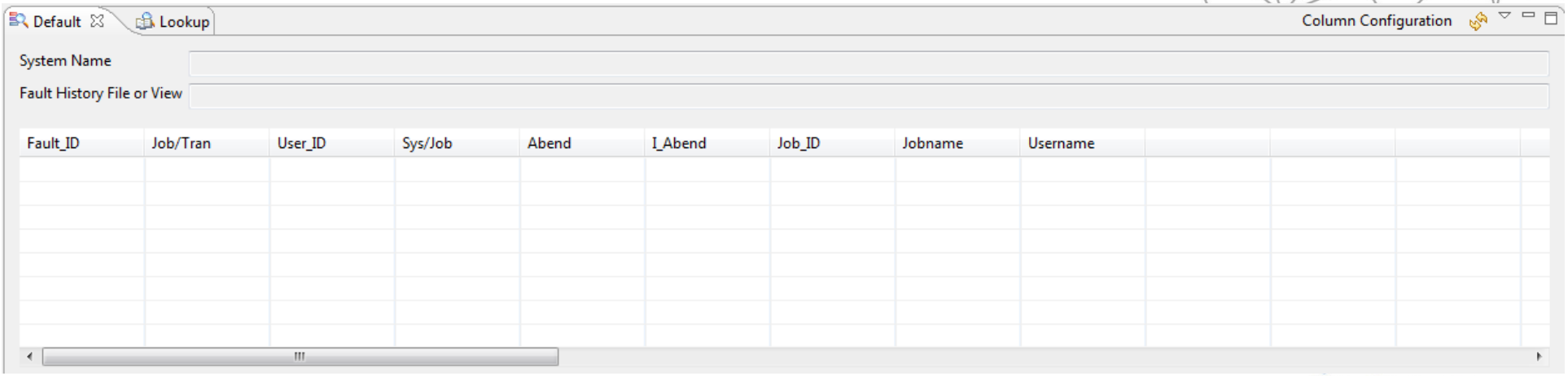
NOTE: May have to select other if not seen in the list above

Fault Analyzer: Open the perspective

- The Fault Analyzer Artifact window will open

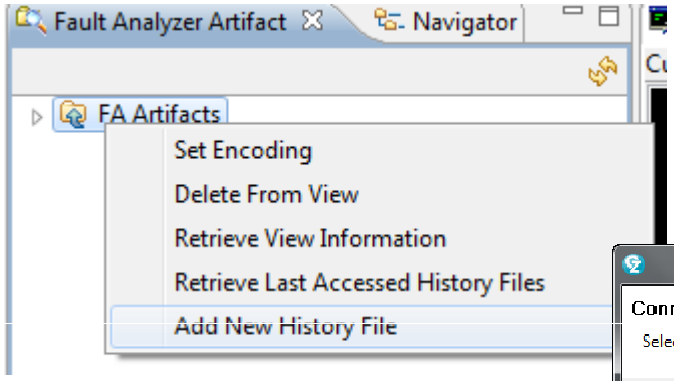


The default view will open

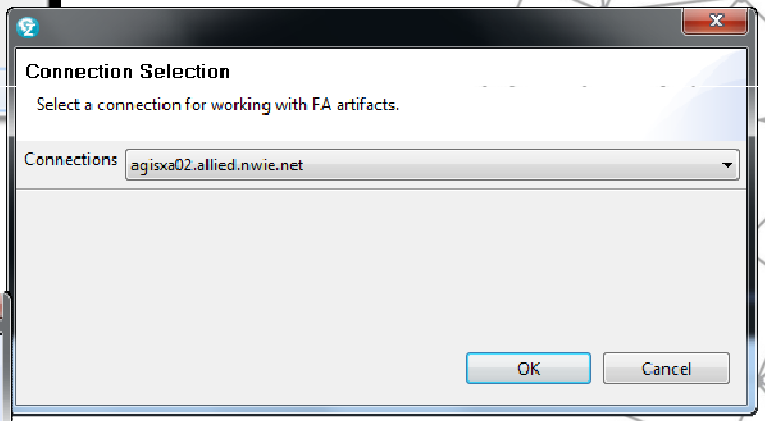


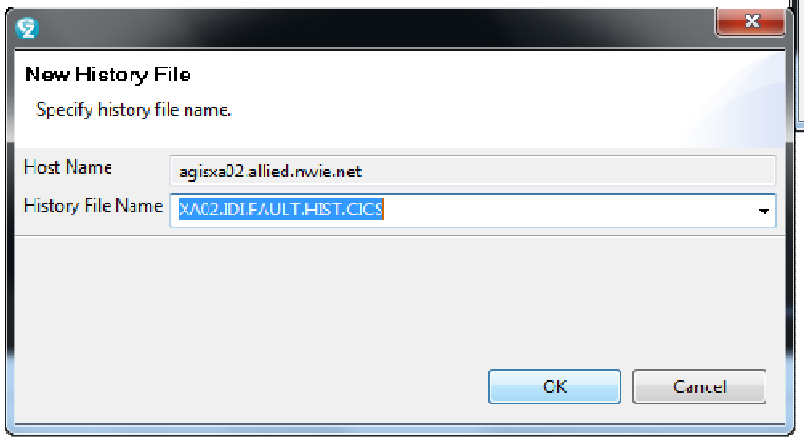
Fault Analyzer: Set up the files

- If the history file(s) are not set up, you can add them by:
  Right-click → Add New History File



- Select Connection and click <OK>
- Type History File Name and click <OK>

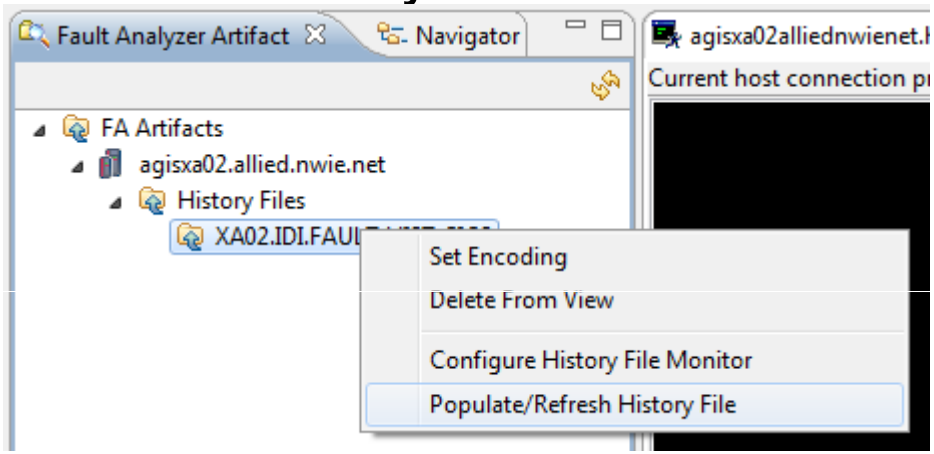




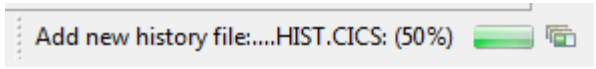
- Tip: History file names kept on our wiki

Fault Analyzer: View the files

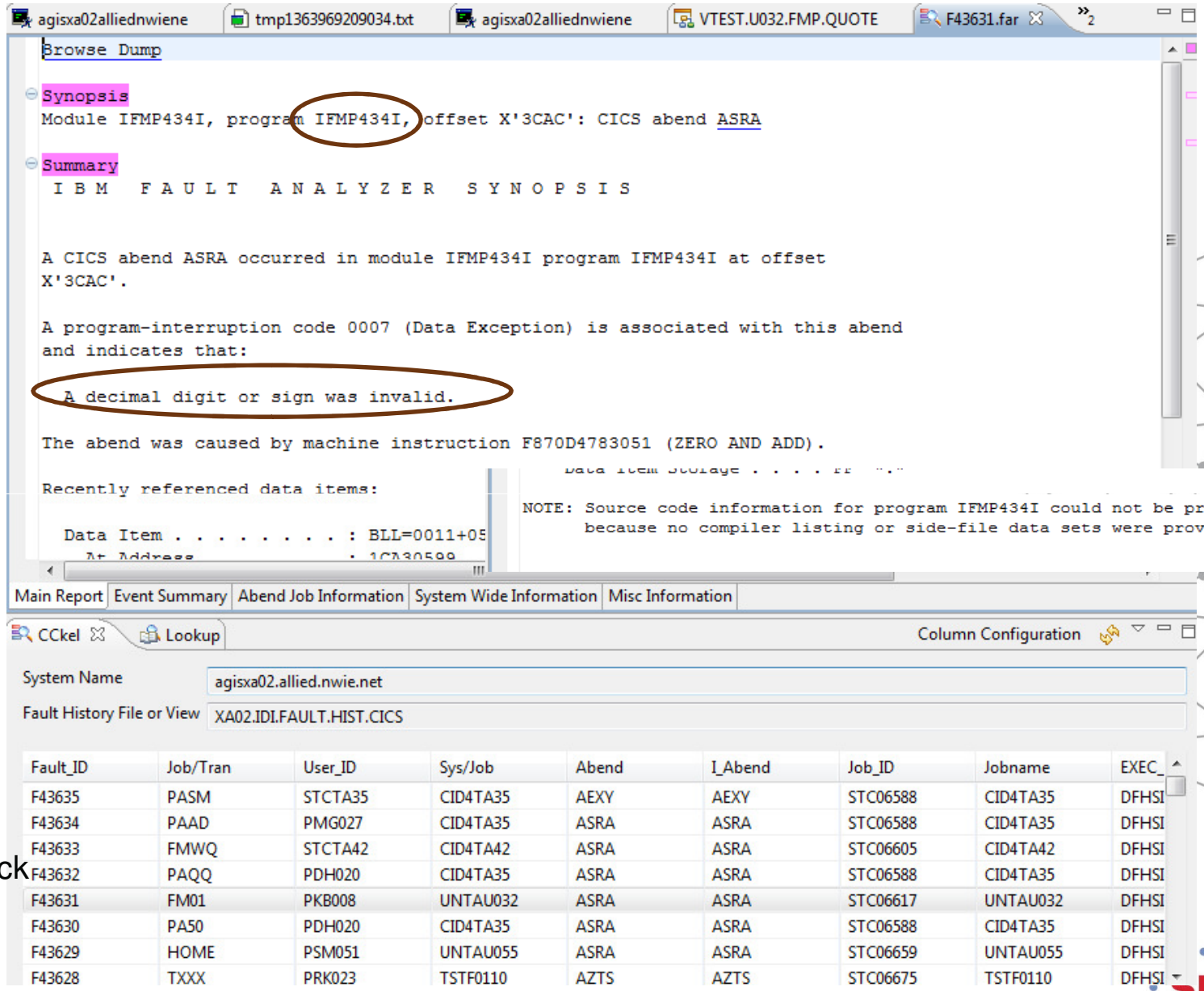
- Right-click the history file name and select Populate/Refresh History file



TIP: You might think nothing is happening! Check out the lower right-hand side of your screen for a status:



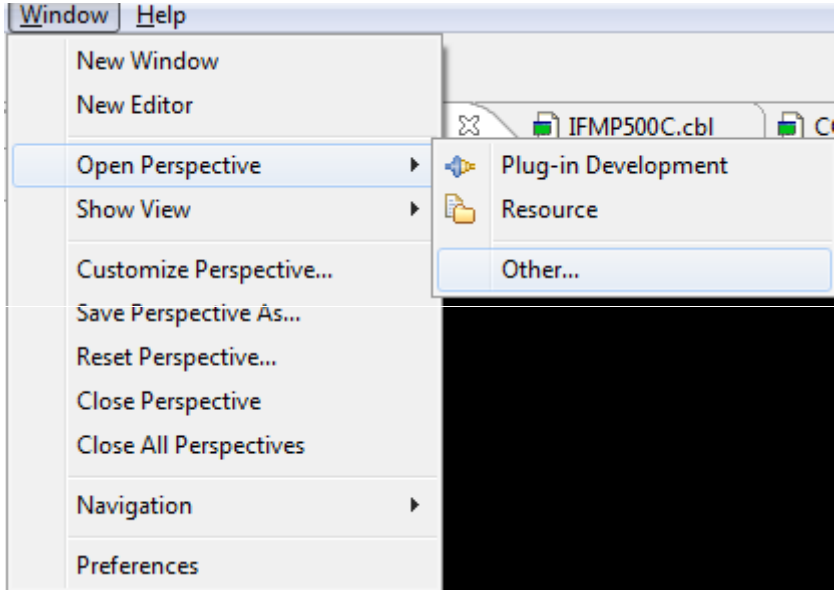
Fault Analyzer



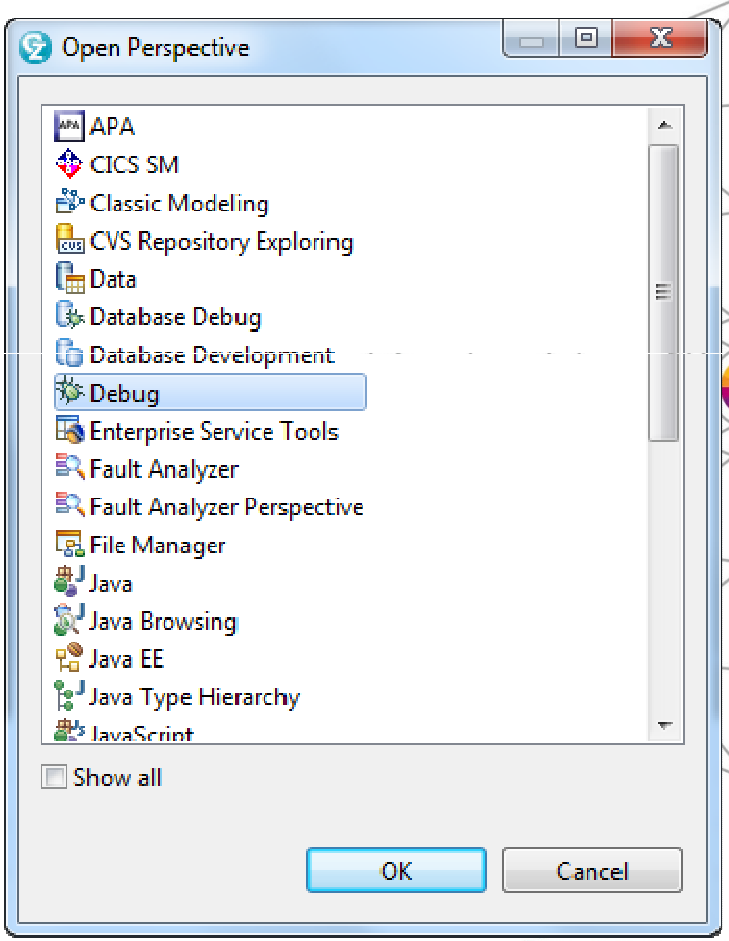
Double-click this →

Debug: Open the perspective

- Window → Open Perspective → Debug (or Other…) if Debug not seen

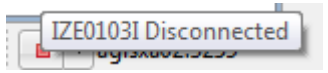


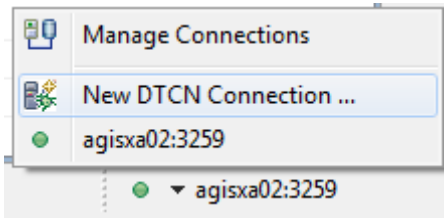
- Select Debug and Click <OK>



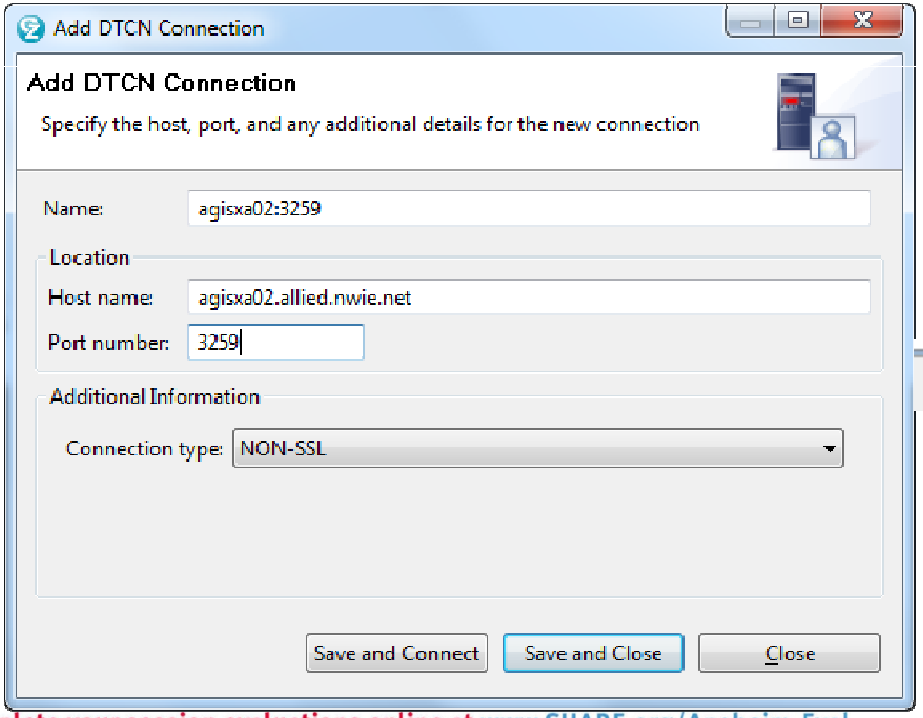
Debug: Set up connection to CICS

- Look in the lower right corner of your screen to see if you have a connection and verify it is pointing to the region (port) you are debugging in
- If needed, Click the arrow and select New DTCN Connection:

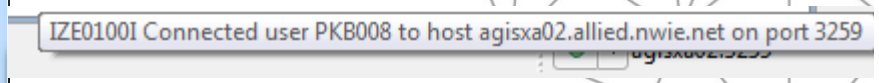




Tip: You could configure debug ports by region in a default workspace. We keep our regions/ports on our wiki.



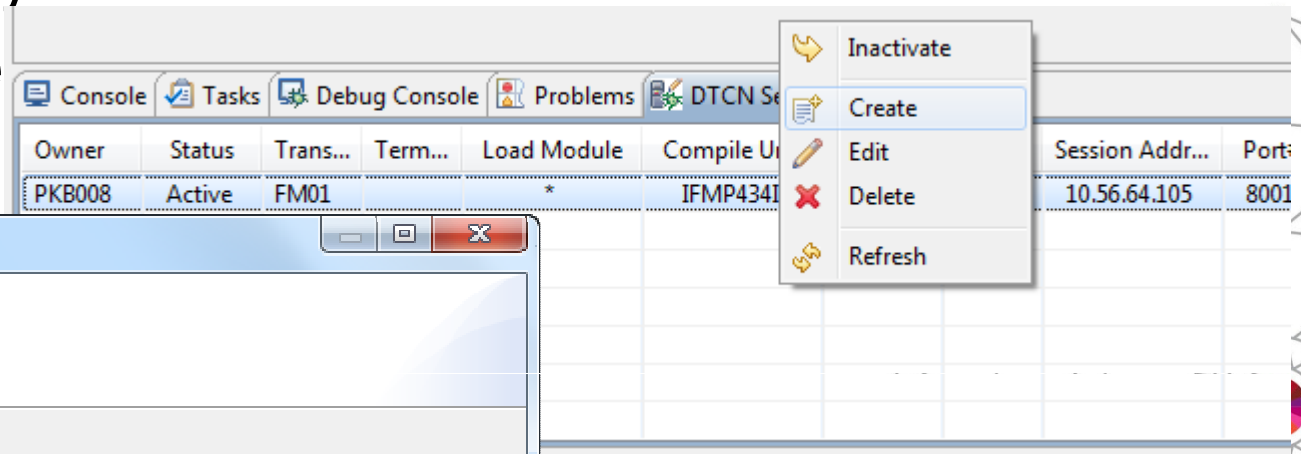
- Type Host name and Port number
- Click <Save and Close>

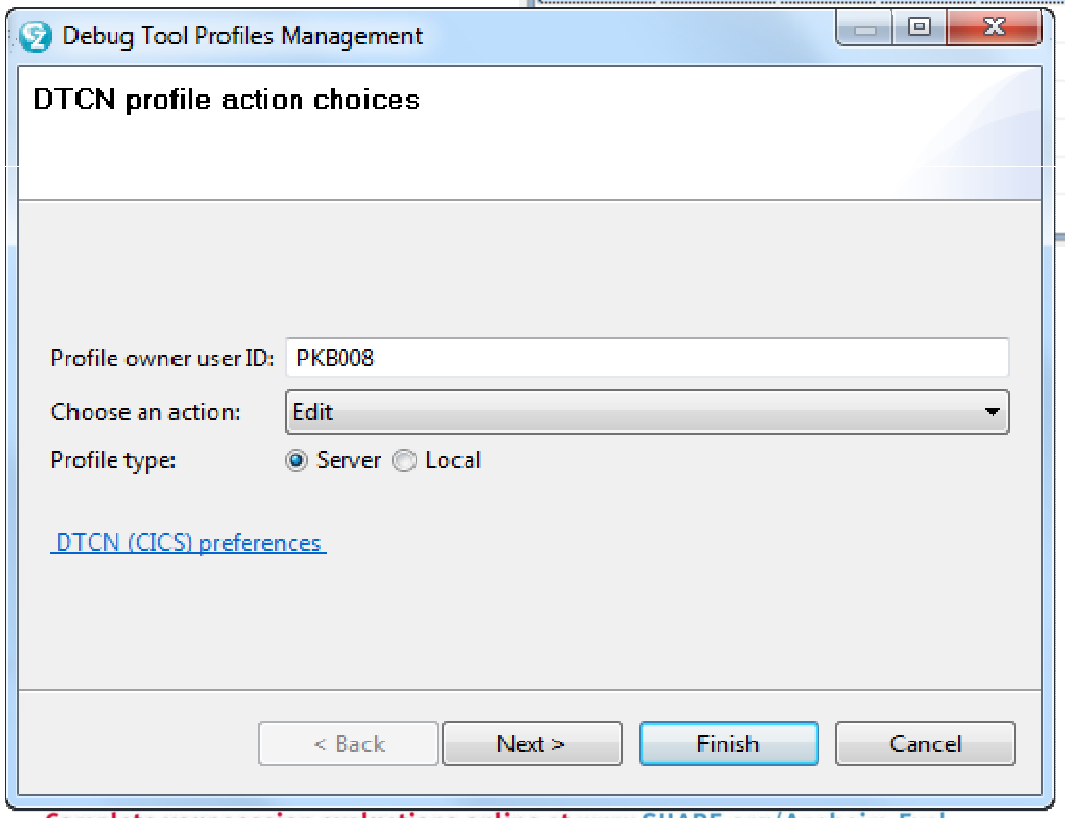


- Tip: If you don't see the lower right connection icon, make sure the DTCN Server Profiles view is open and active. You may have to open it from Windows → Show View (type DTCN)

Debug: Set up DTCN profile

- Right-click anywhere in the DTCN Server Profiles view
- Select Create

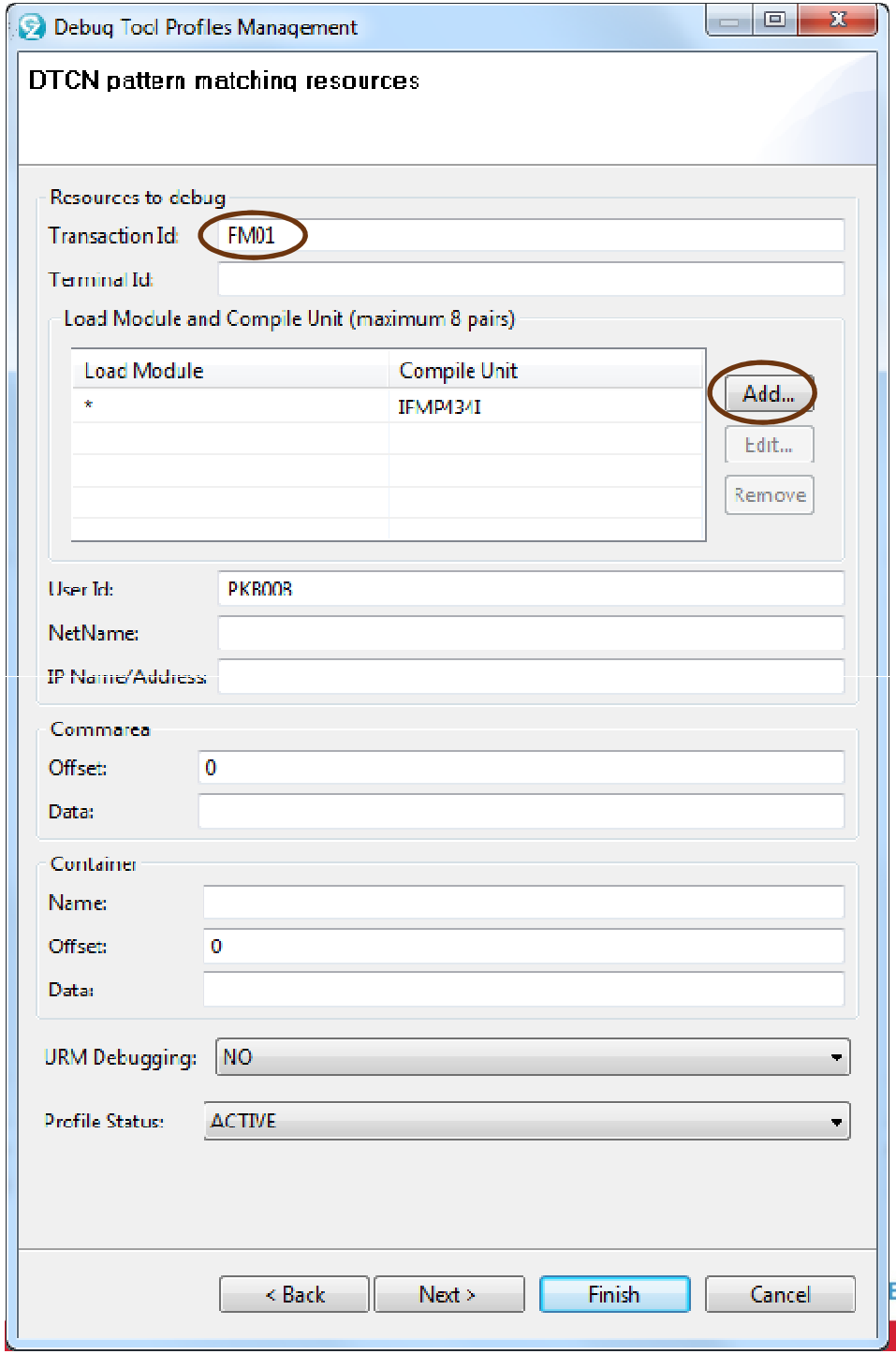


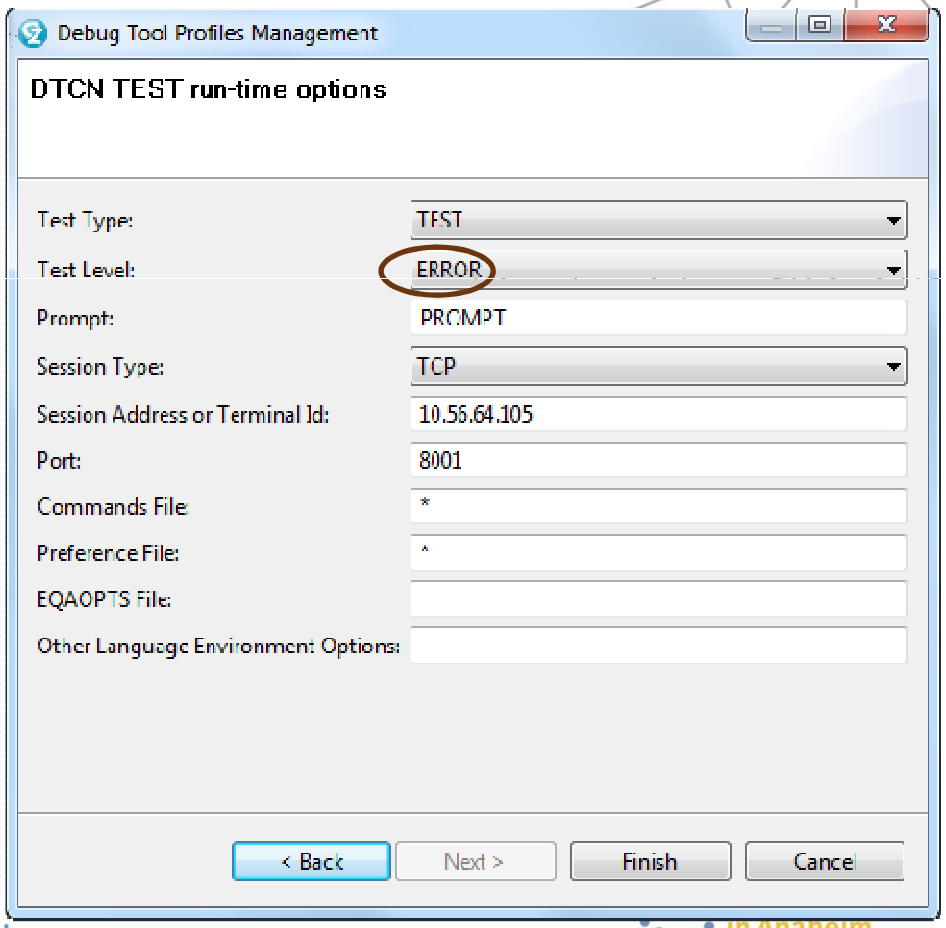


- Click <Next>

Debug: Set up DTCN profile

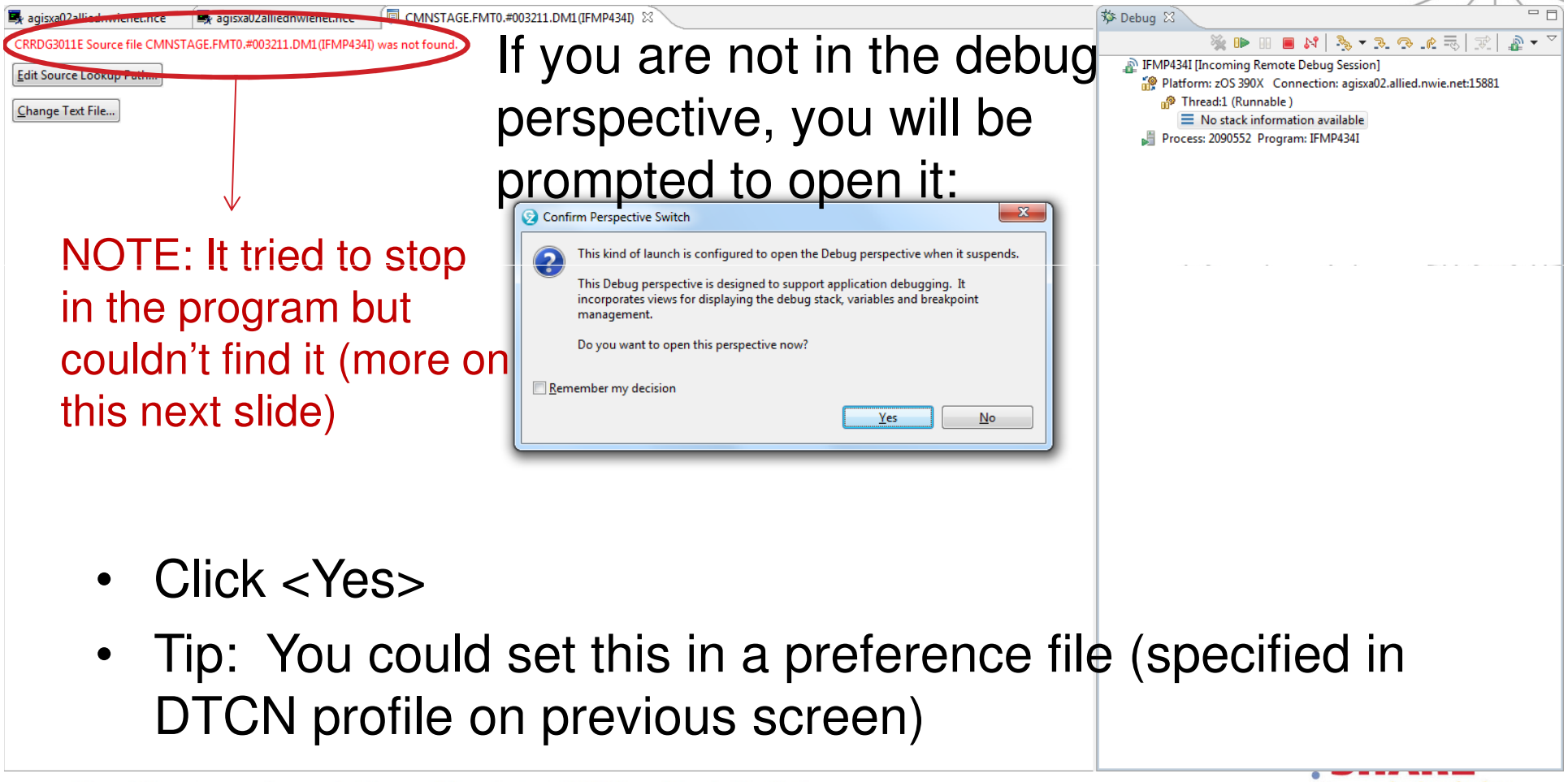
- Enter info (Transactio ID, Compile Unit)
- Click <Next>
- (Changed Test Level to ERROR)
- <Finish>





Debug: Run the transaction

- In Host Emulator CICS region, type transaction, <Enter>, enter policy #/quote inquiry, <Enter>



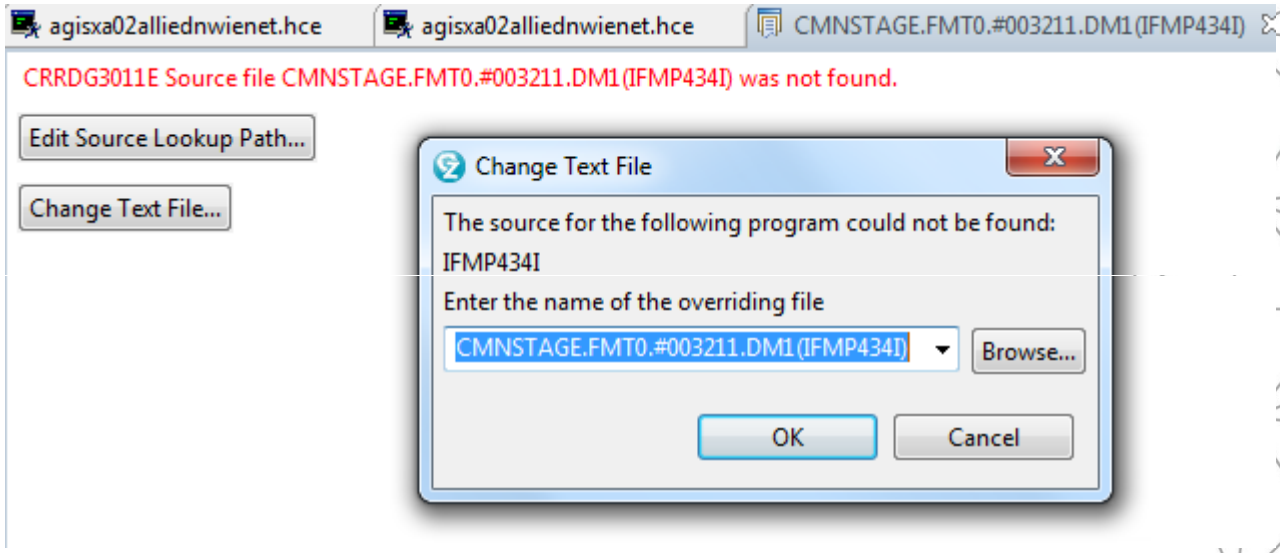
NOTE: It tried to stop in the program but couldn't find it (more on this next slide)

If you are not in the debug perspective, you will be prompted to open it:

- Click <Yes>
- Tip: You could set this in a preference file (specified in DTCN profile on previous screen)

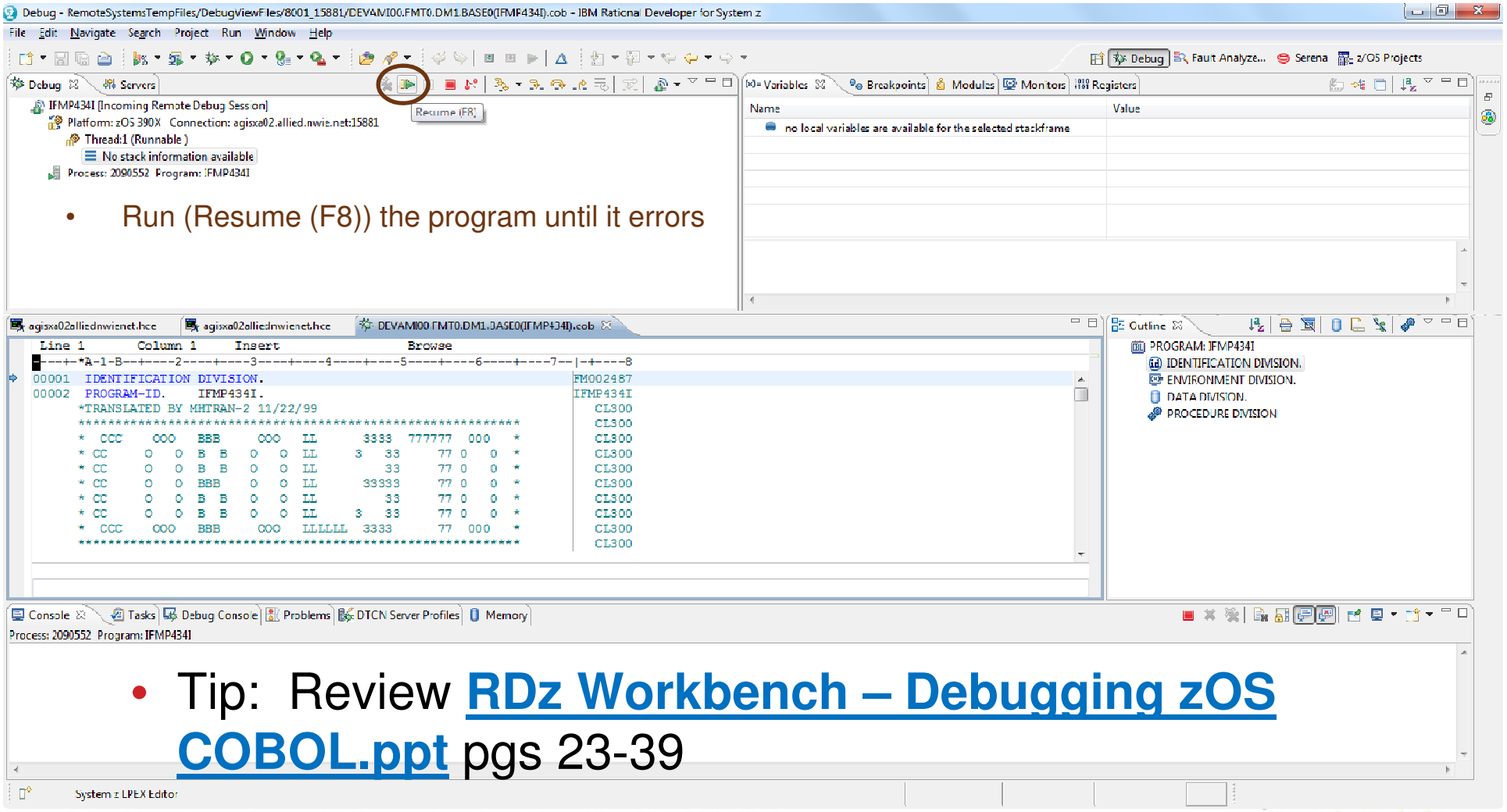
Debug: Tell Debug where to get the source (if it didn't find it)

- Click <Change Text File>



- NOTE: In this case, all files should be in: DEVAMI00.FMT0.DM1.BASE0

Debug: The Layout

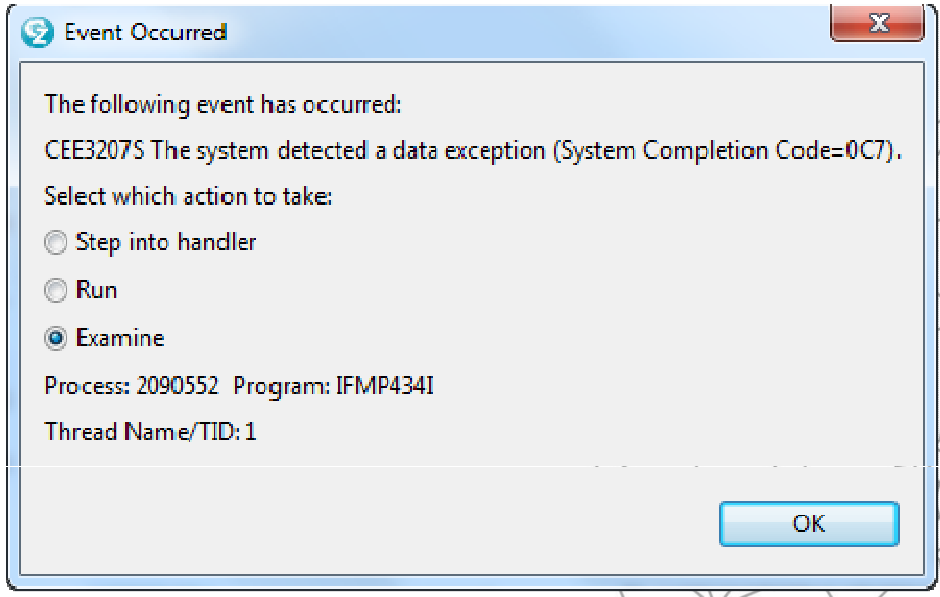


- Run (Resume (F8)) the program until it errors

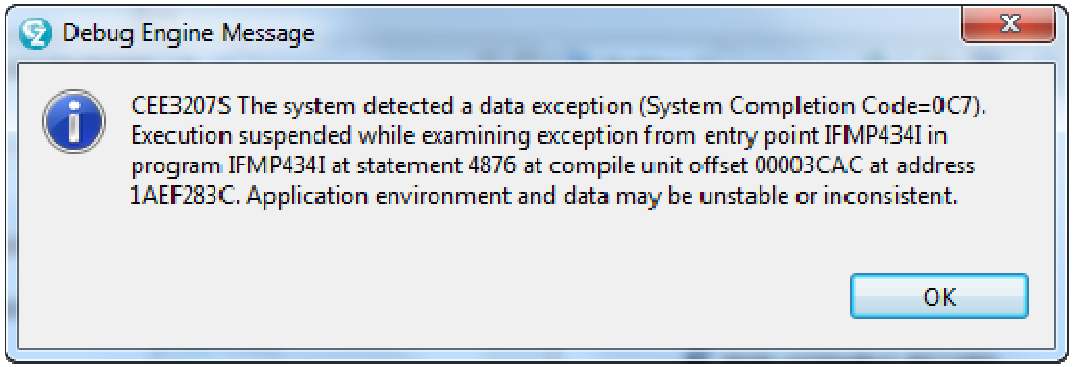
- Tip: Review [RDz Workbench – Debugging zOS COBOL.ppt](#) pgs 23-39

Debug: Analysis

- Select Examine and click <OK>

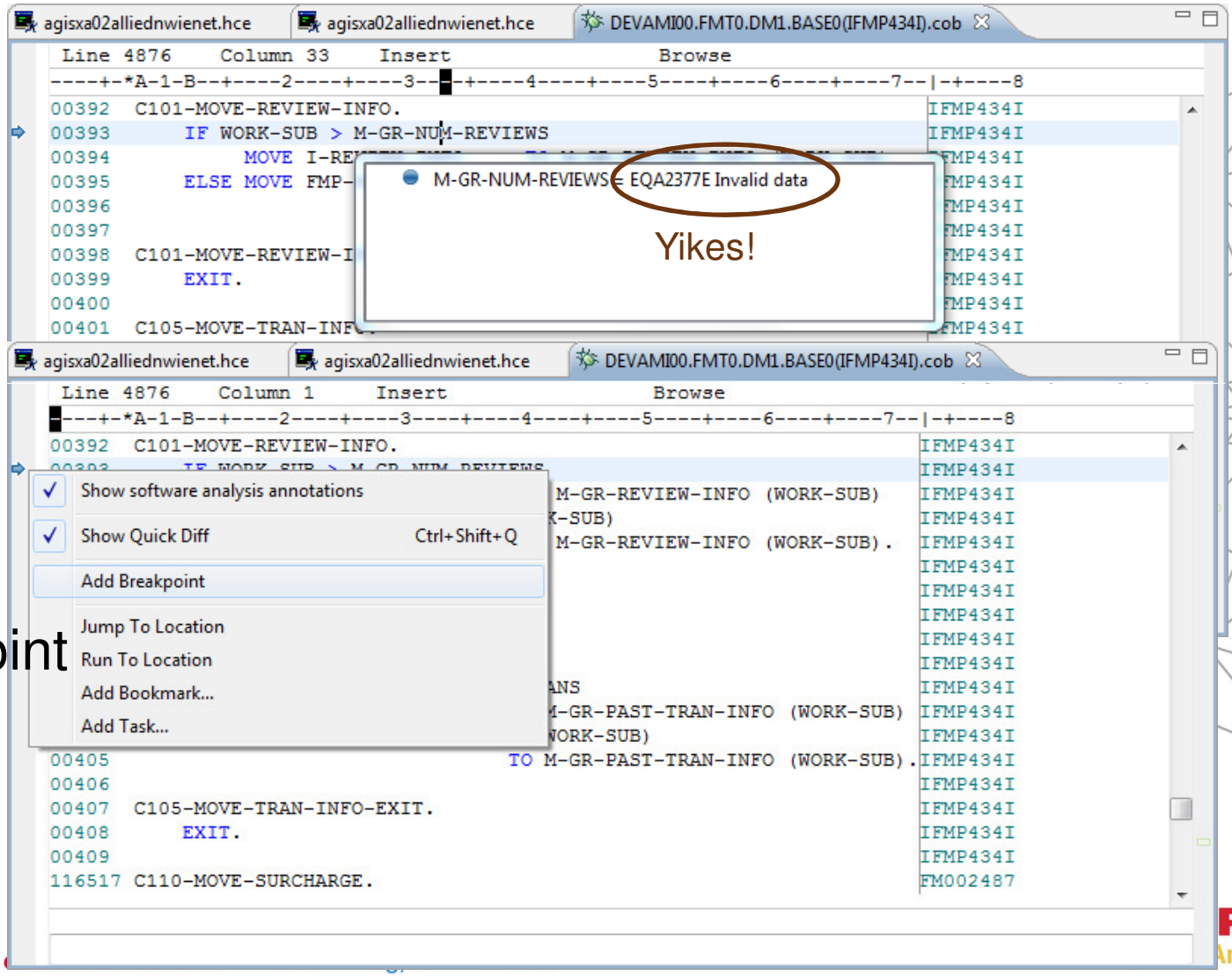


- Click <OK>



Debug: Analysis

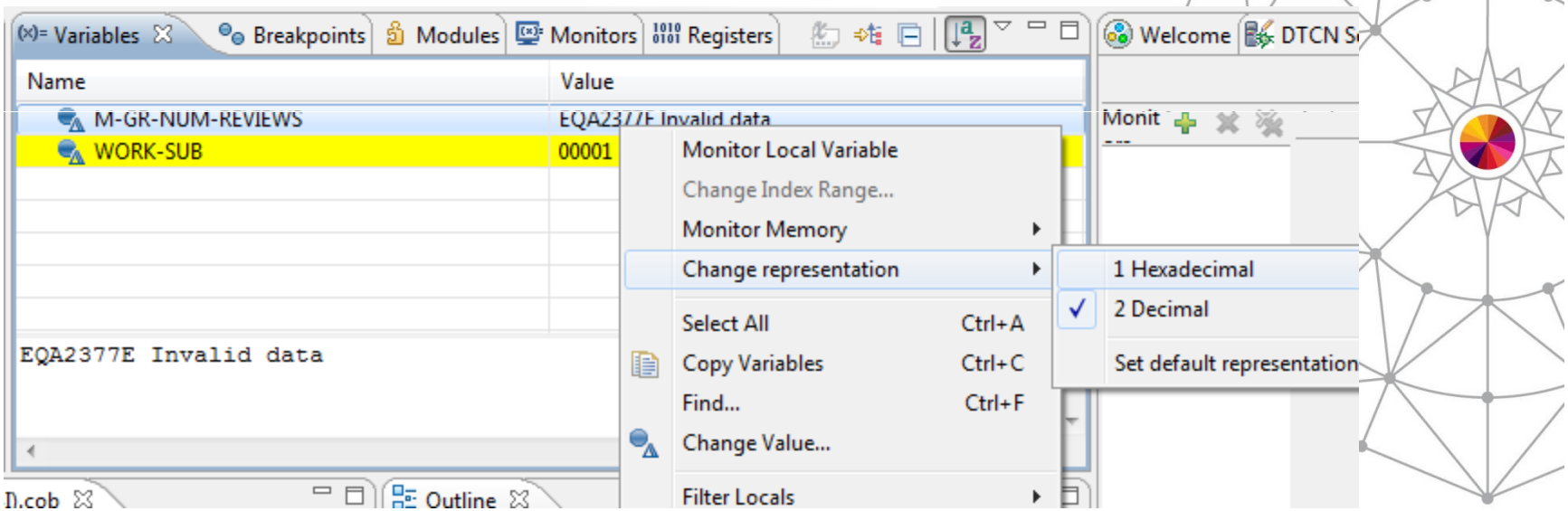
- Hover



- Add a breakpoint

Debug: Analysis

- Examine values – look in the Variables view
- View in Hex: Right-click → Change representation → Hexadecimal



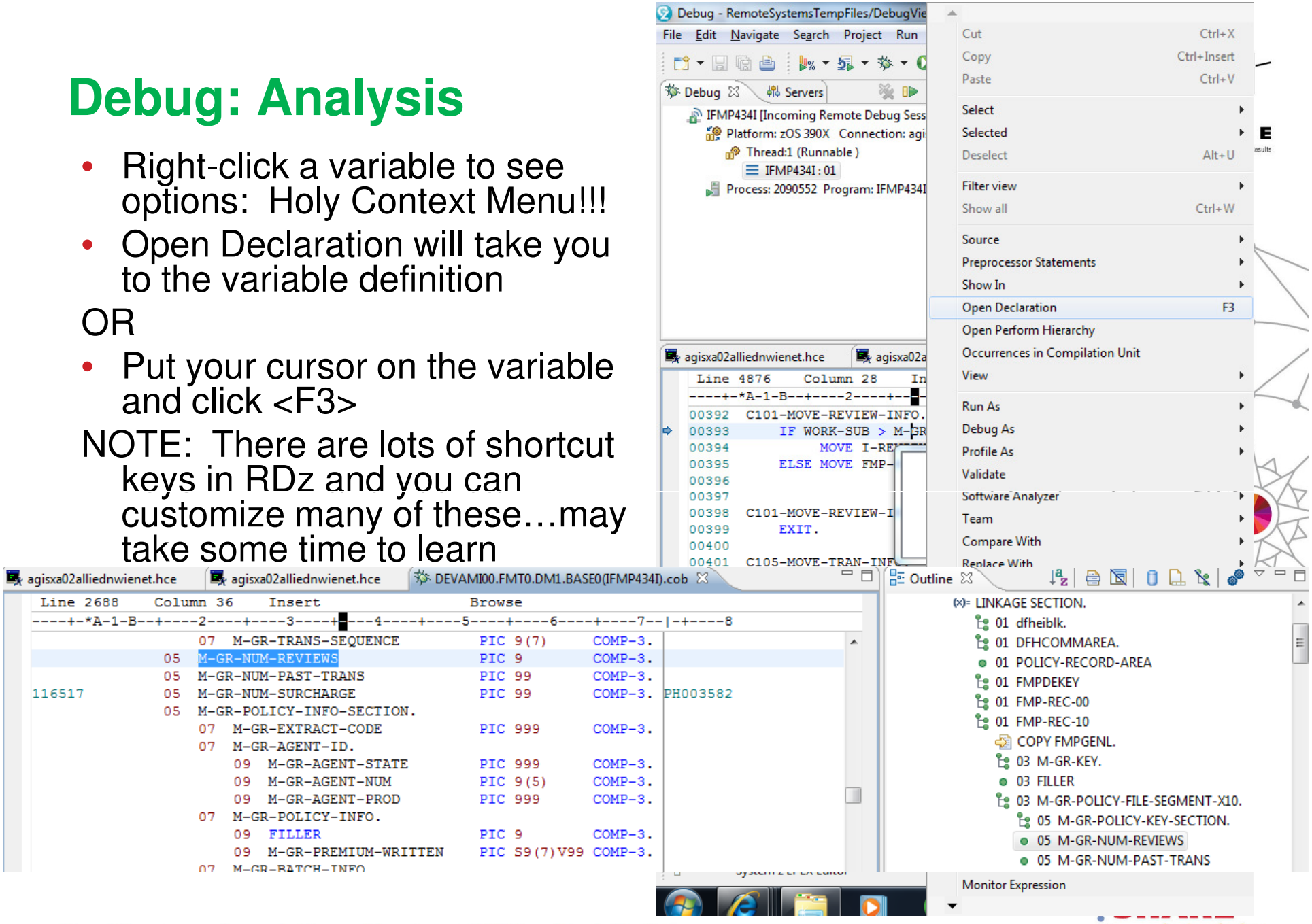
Debug: Analysis

- Right-click a variable to see options: Holy Context Menu!!!
- Open Declaration will take you to the variable definition

OR

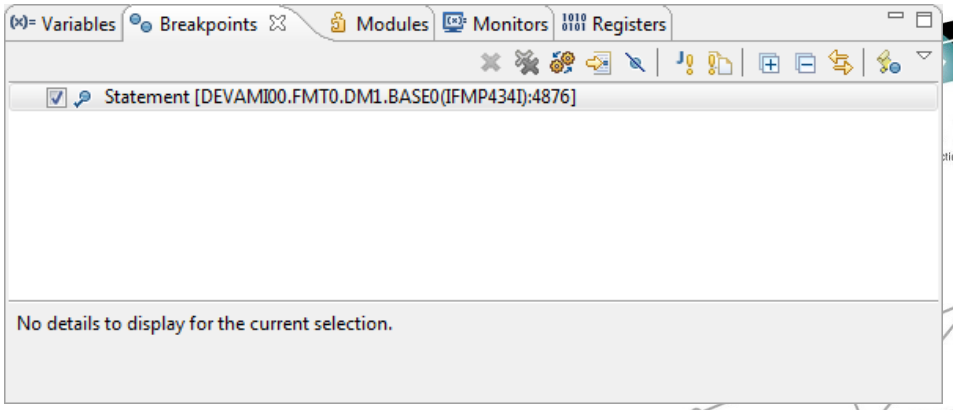
- Put your cursor on the variable and click <F3>

NOTE: There are lots of shortcut keys in RDz and you can customize many of these…may take some time to learn



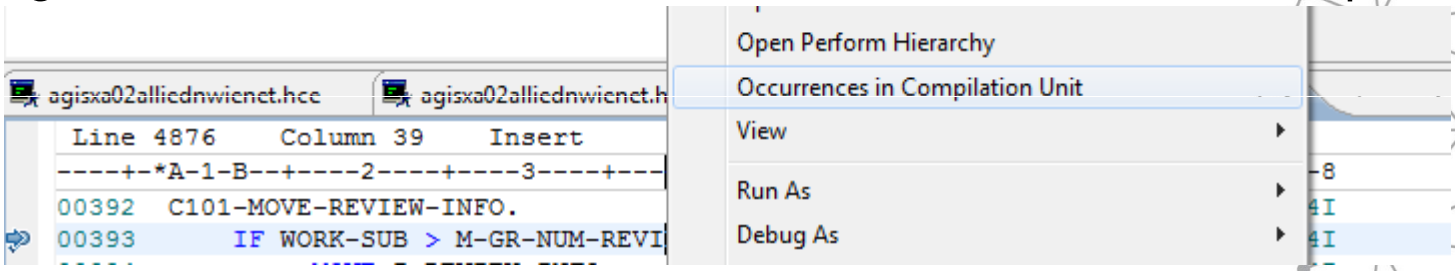
Debug: Analysis

- Tip: Double-click your breakpoint to get back

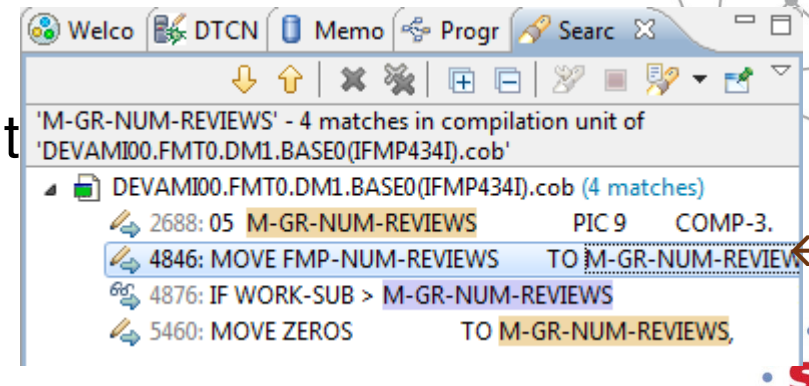


Where does this variable get its value from?

- Right-click on the variable and select Occurrences in Compilation Unit



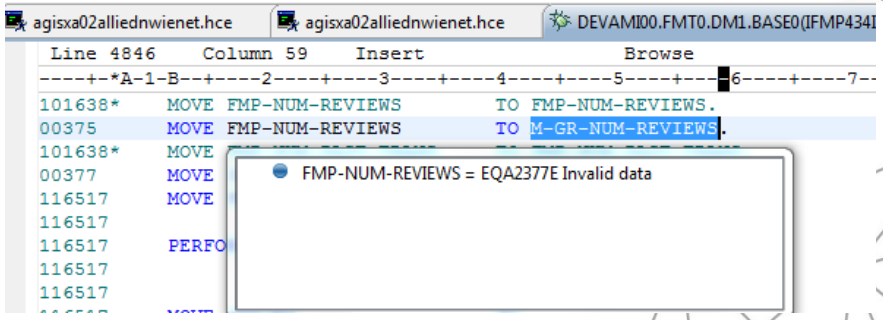
- Opened a search window
- Double-click any of these to quickly navigate to that point in the source



← Double-click this

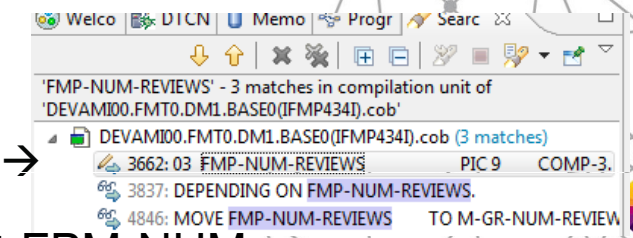
Debug: Analysis

Navigates directly to source statement where you can see the source of the invalid value

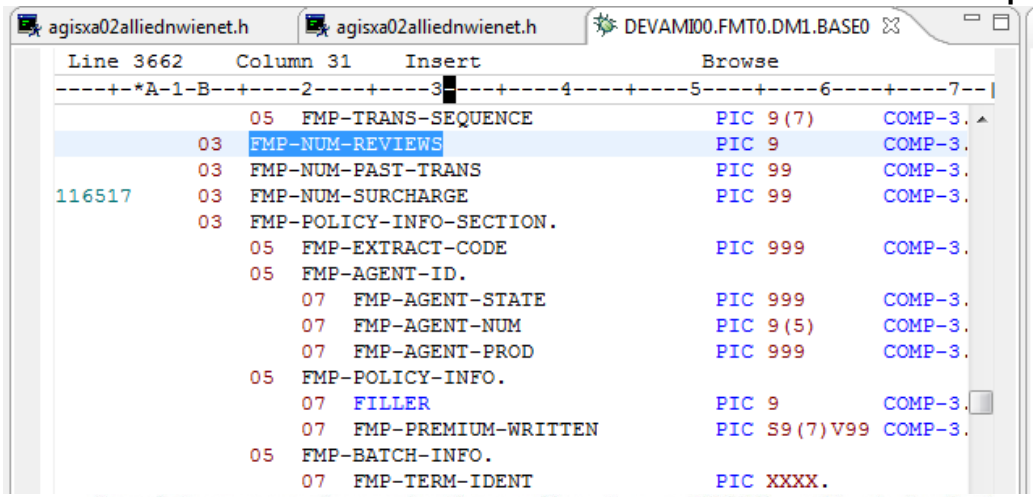


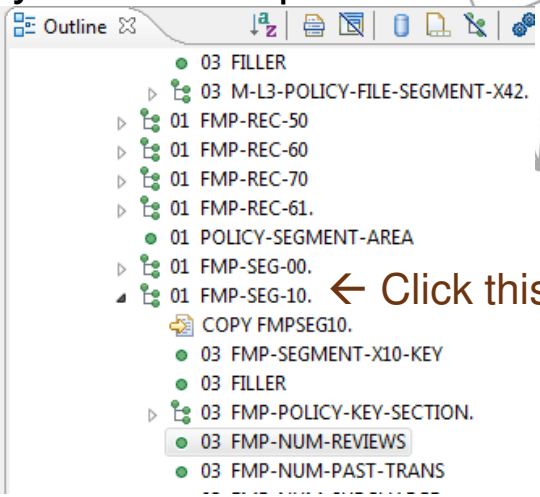
- Right-click with cursor in FMP-NUM-REVIEWS and Occurrences in Compilation Unit

Double-click this →



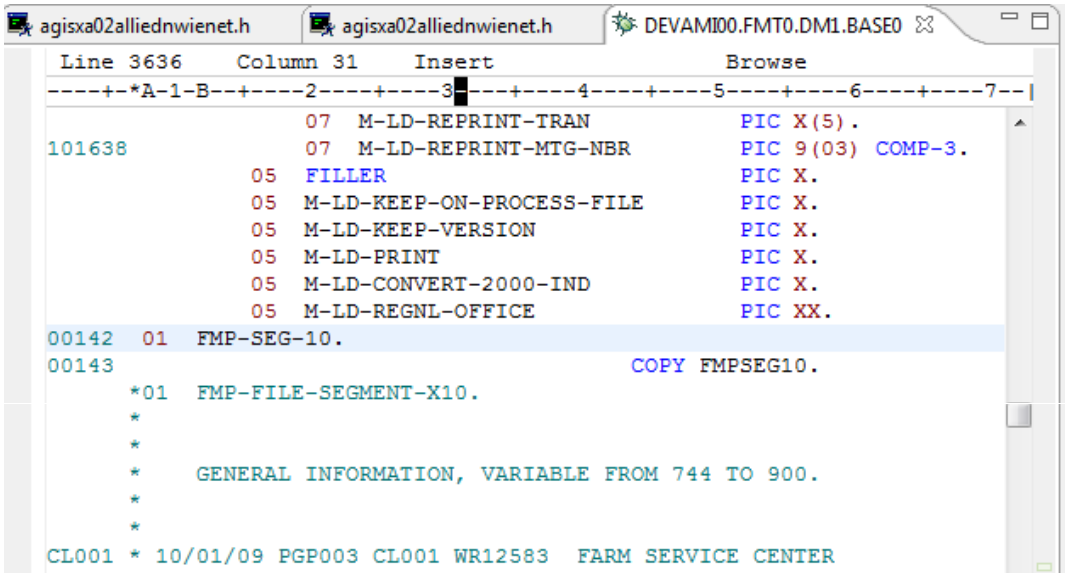
- The Outline view will nicely show the 01 level that FPM-NUM-REVIEWS is defined under …and the copybook it is a part of

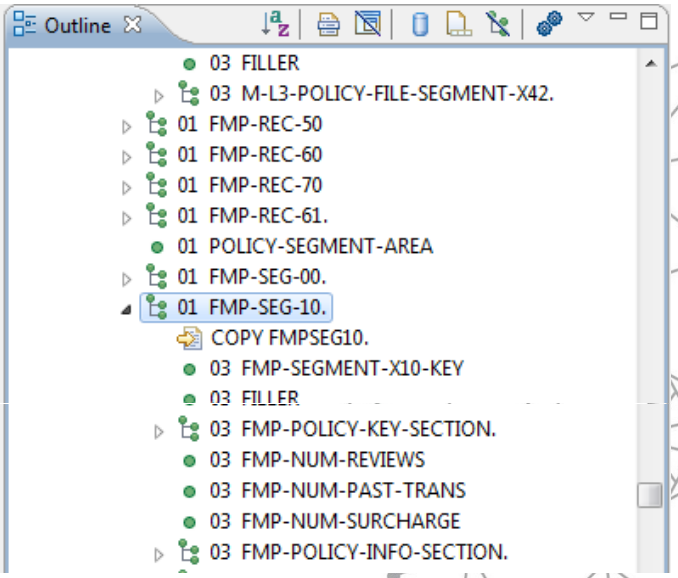




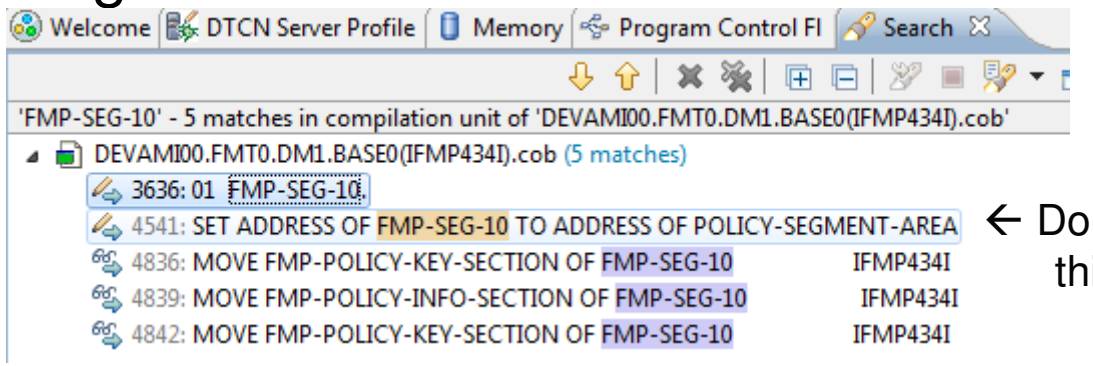
← Click this

Debug: Analysis





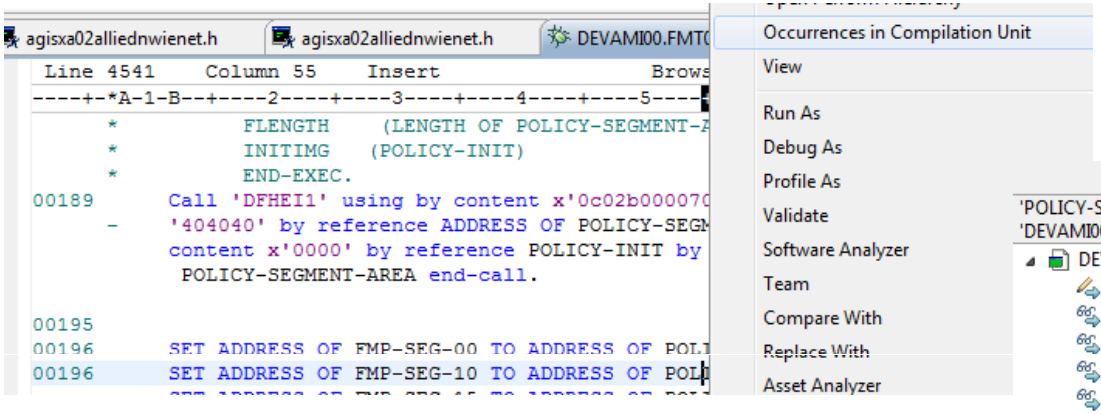
- Right-click with cursor in FMP-SEG-10 and

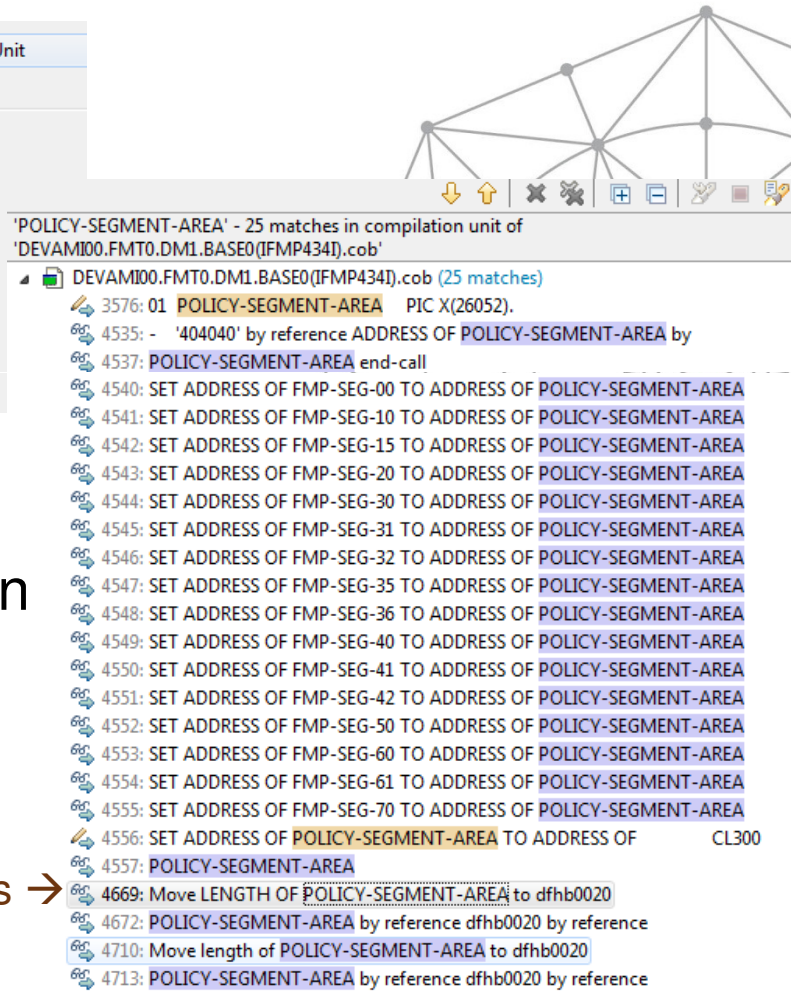


← Double-click this

Debug: Analysis

- Navigates to that line in the source:





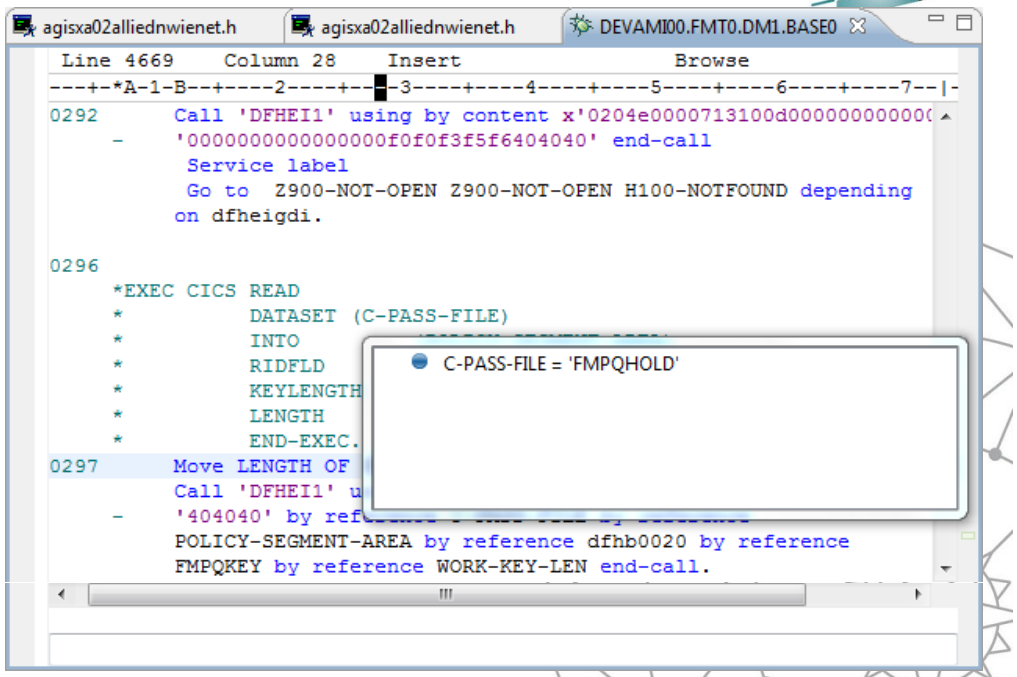
- Right-click with cursor in POLICY-SEGMENT-AREA and Occurrences in Compilation Unit

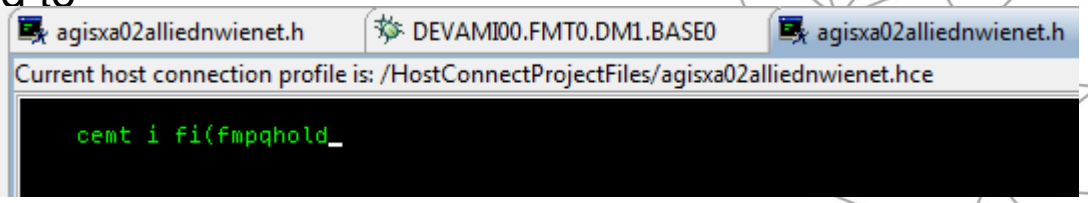
NOTE: CICS programmers will recognize a Move LENGTH OF… as part of a compiler translation of an EXEC CICS READ command

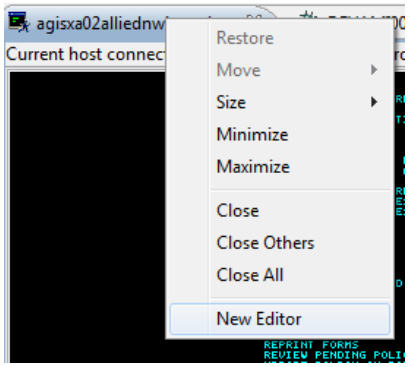
Double-click this →

Debug: Analysis

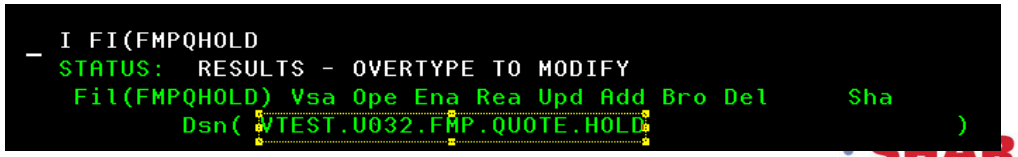
- Navigates to that line in the source:
- Hover the C-PASS-FILE variable to see the file name (NICE, you can see this even though code is commented!)
- Now I can go find the actual file in CICS
- Tip: You can easily open another session by right-clicking the current session and selecting New Editor
- Use the CEMT I FI command to get the DSN







- Copy the DSN to your clipboard: (select and CTRL-C)

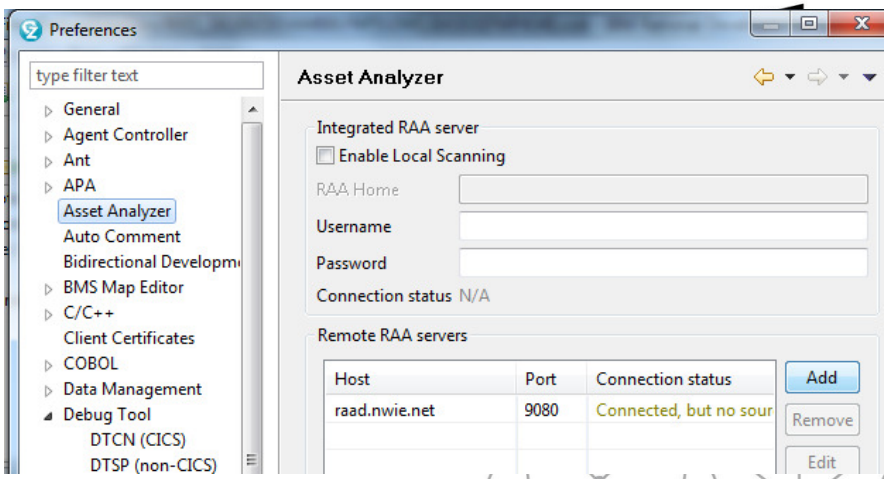


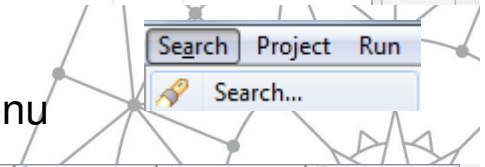
COBOL Mainframe Modernization - DEMO

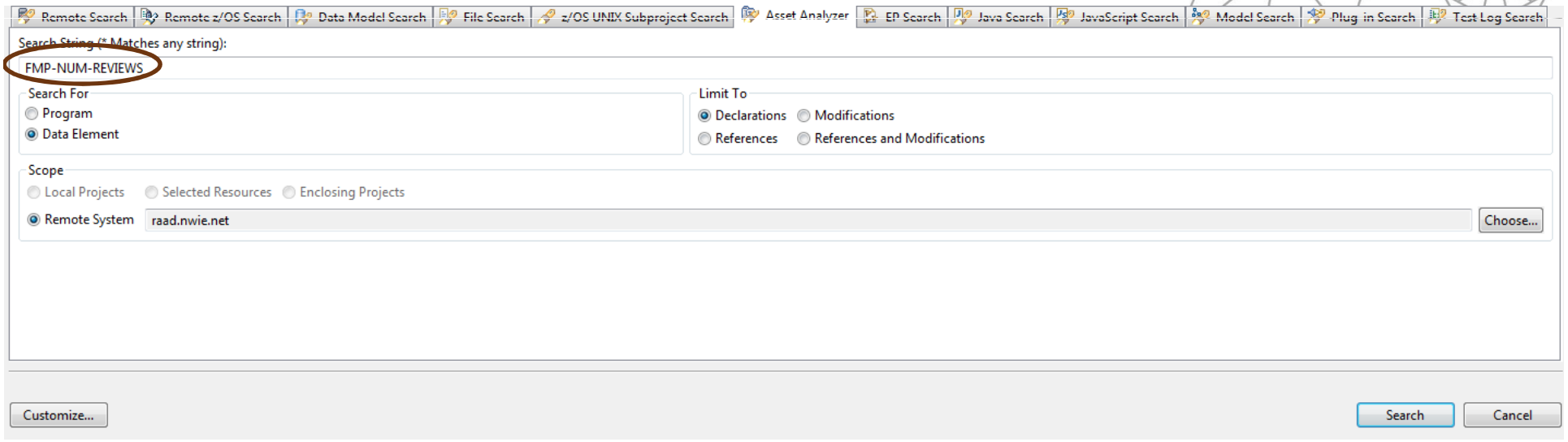
- Part 1: RDz Working CICS Transaction
- Part 2: The ABEND
- Part 3: Analysis
  - Fault Analyzer – where it happened (program)
  - Debug – why it happened (drill down)
- Part 4: The Fix
  - RAA – find a copybook for a file
  - File Manager – view/edit the file (fix bad data)
- Part 5: What if it requires a code change?
  - ChangeMan

RAA: Where's the copybook?

- We will want to open the file in File Manager, but it would be nice to see it formatted
- We can use RAA to find out which library the copybook is in
- RAA is easily set up (one-time; saved in workspace)
- Now I can search by selecting Search → Search… from the top menu

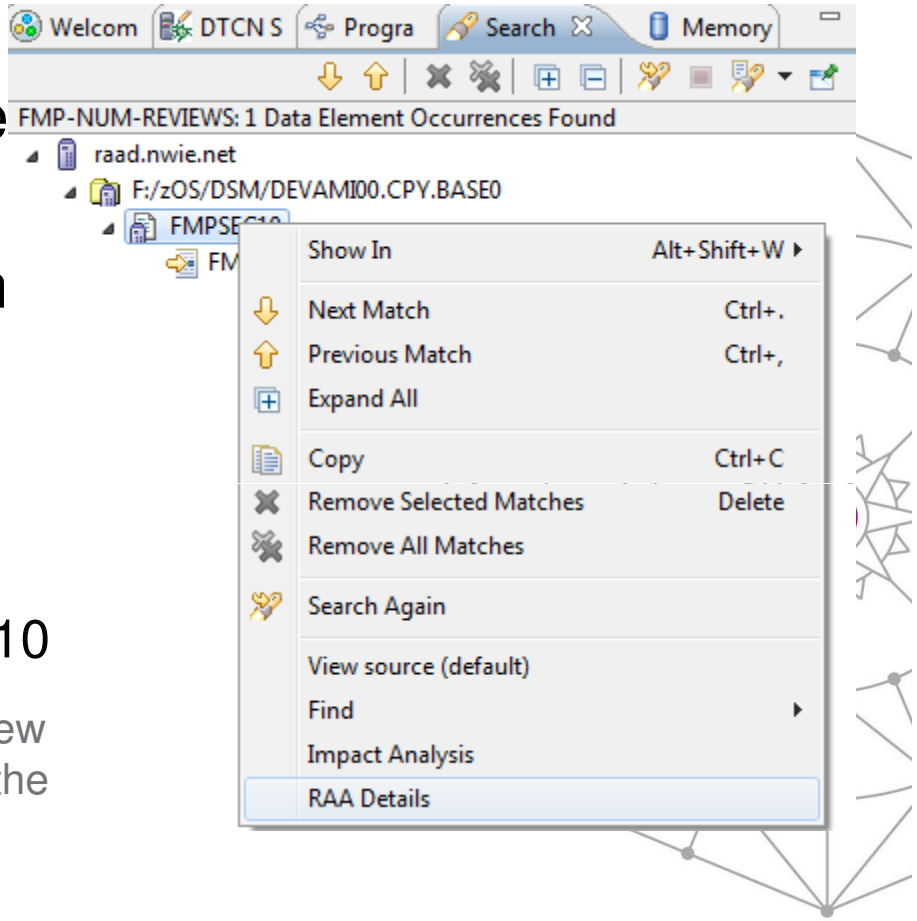


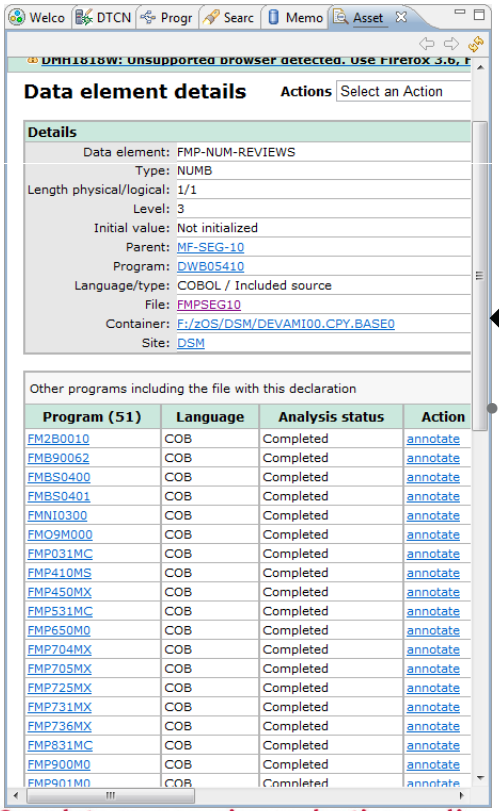




RAA: Where's the copybook?

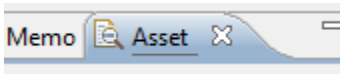
- Search View results.
- Right-click the copybook name and select RAA Details
- An Asset details view will open





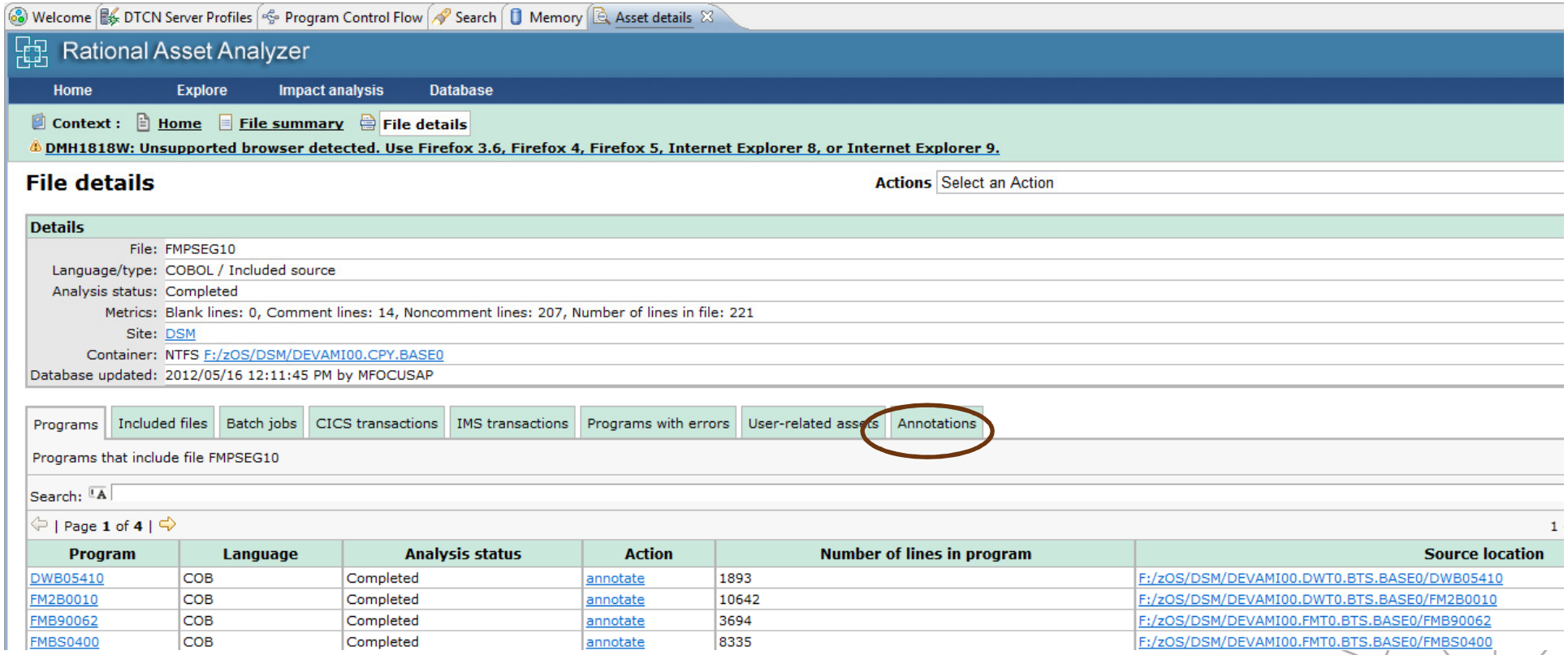
← Click FMPSEG10

Tip: Expand the view by double-clicking the tab



RAA: Where's the copybook?

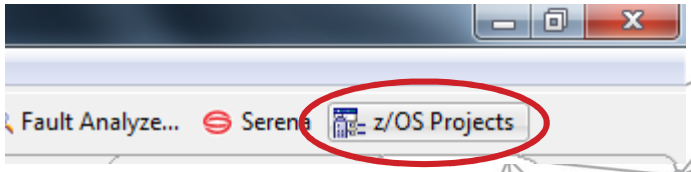
- Click the Annotations tab

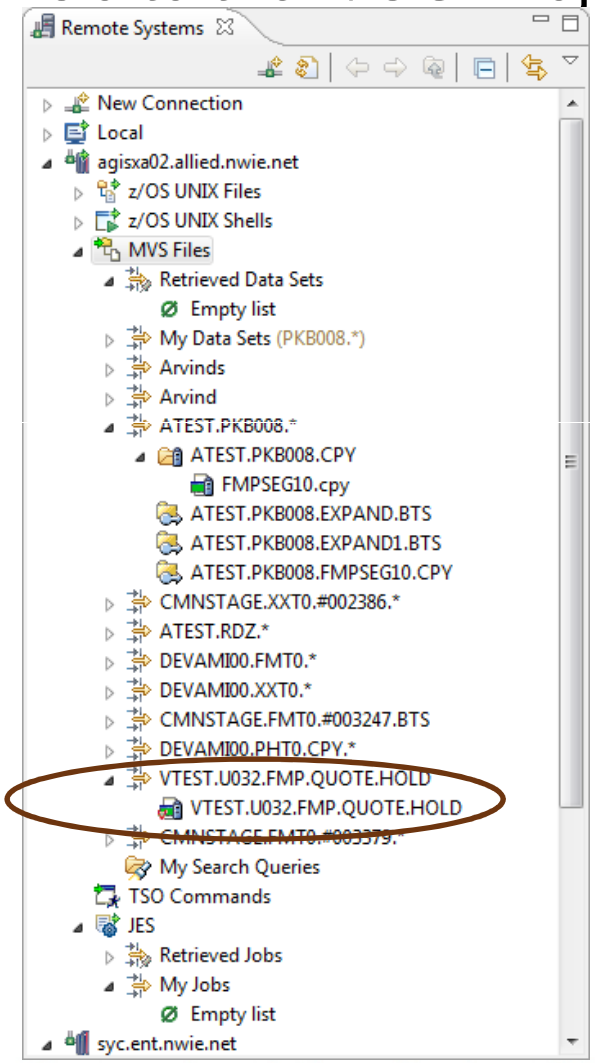


- Found it

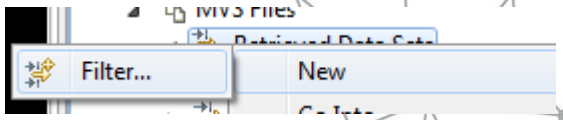
File Manager: Open a file with a copybook

- Go to the z/OS Projects perspective by clicking the icon





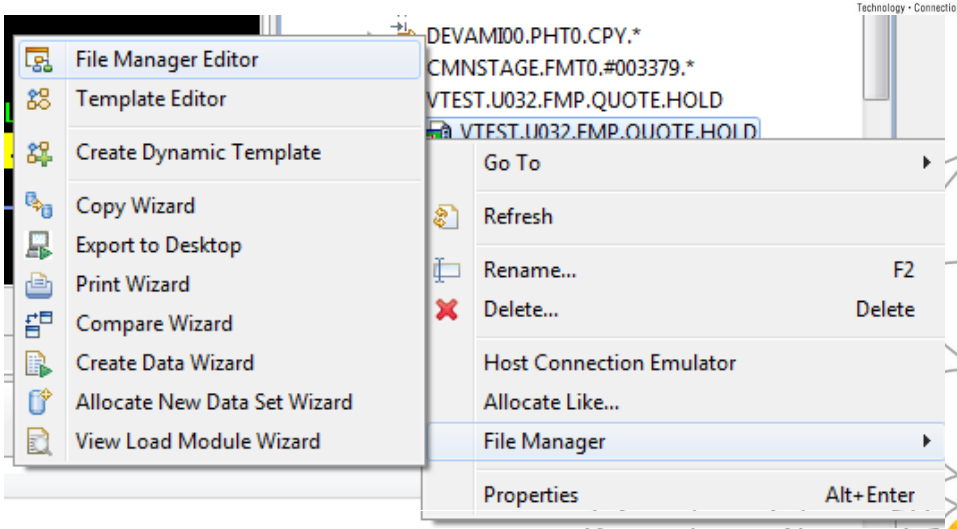
- Find your connection and navigate to MVS files.
- You can set up a filter by right-clicking MVS files (or Retrieved Data Sets) and select New…Filter

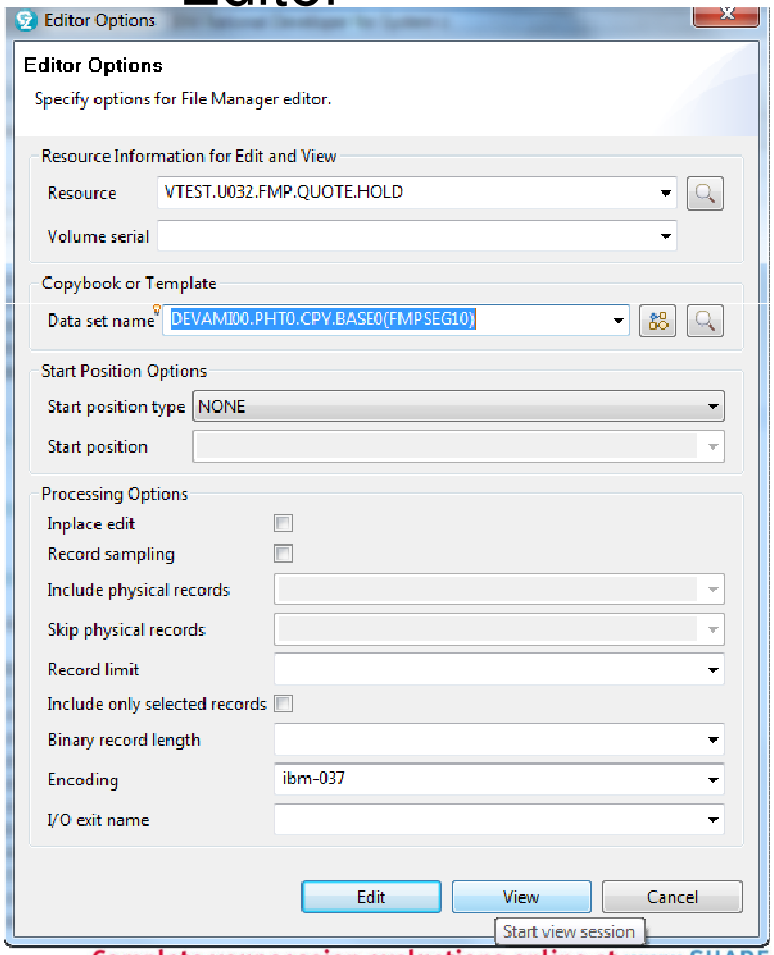


- Paste the DSN name into the Filter String
- Click <Next>
- Paste the DSN and Filter Name field
- Click <Finish>
- You will see the dataset in your list
- Click the arrow to expand the filter to see the dataset
- Right-click the file and select File Manager

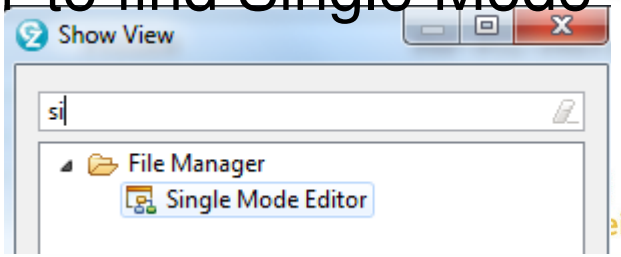
File Manager: Open a file with a copybook

- Select File Manager Editor



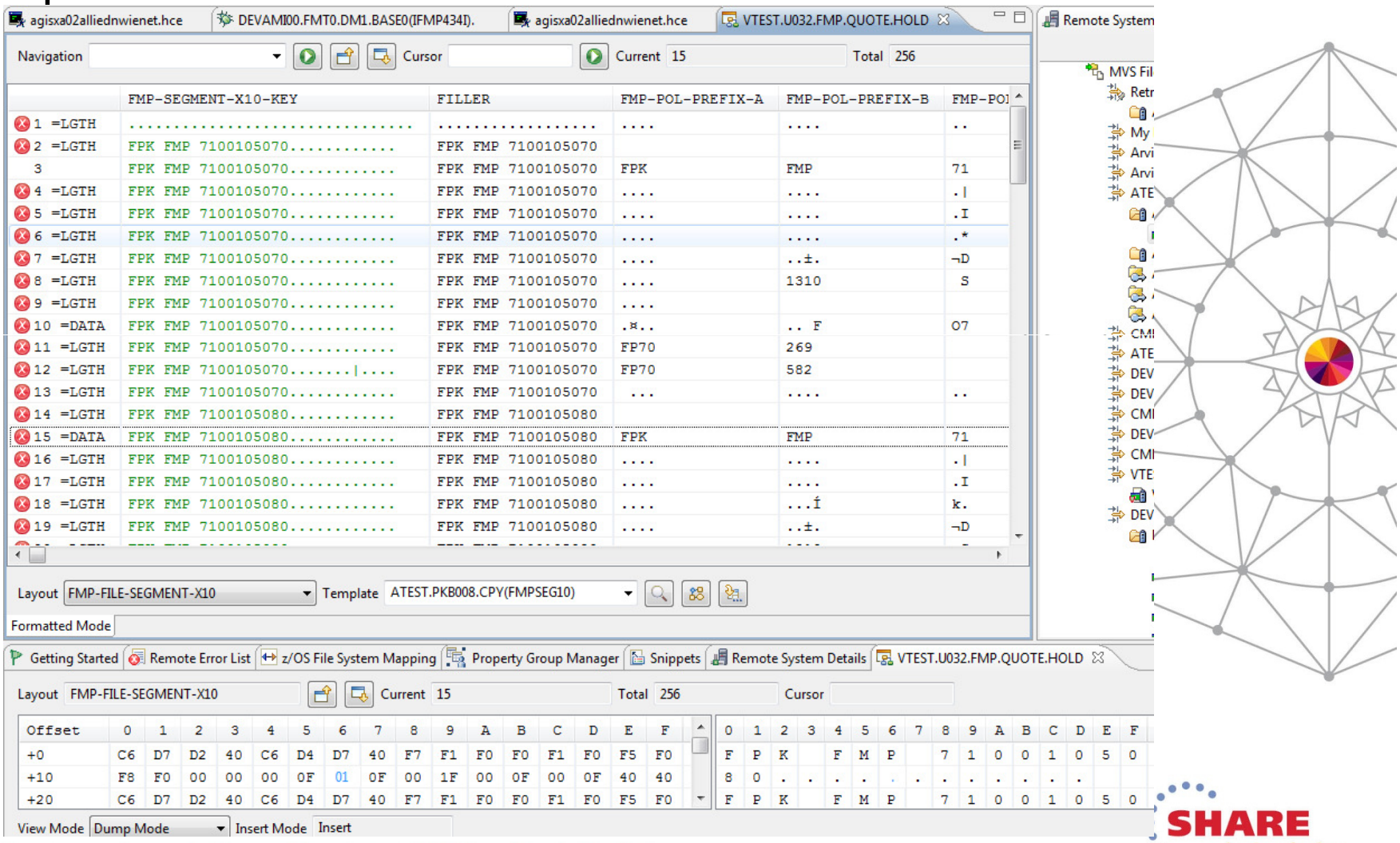


- Key in the Copybook DSN name (from RAA)
- Click <View>
- Tip: Go to Windows→Show View and type ‘si’ to find Single Mode Editor

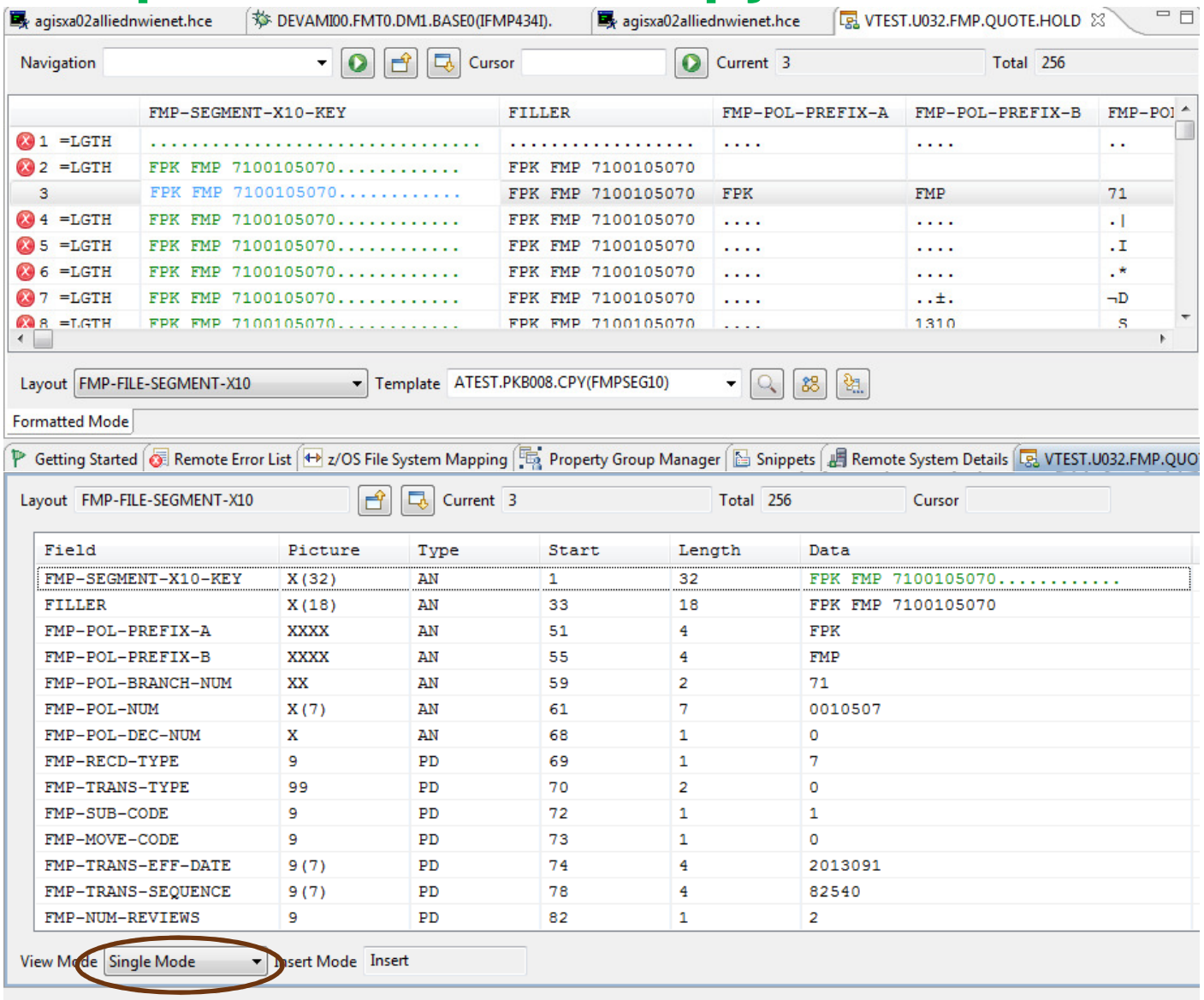


File Manager: Open a file with a copybook

- Opened in editor:



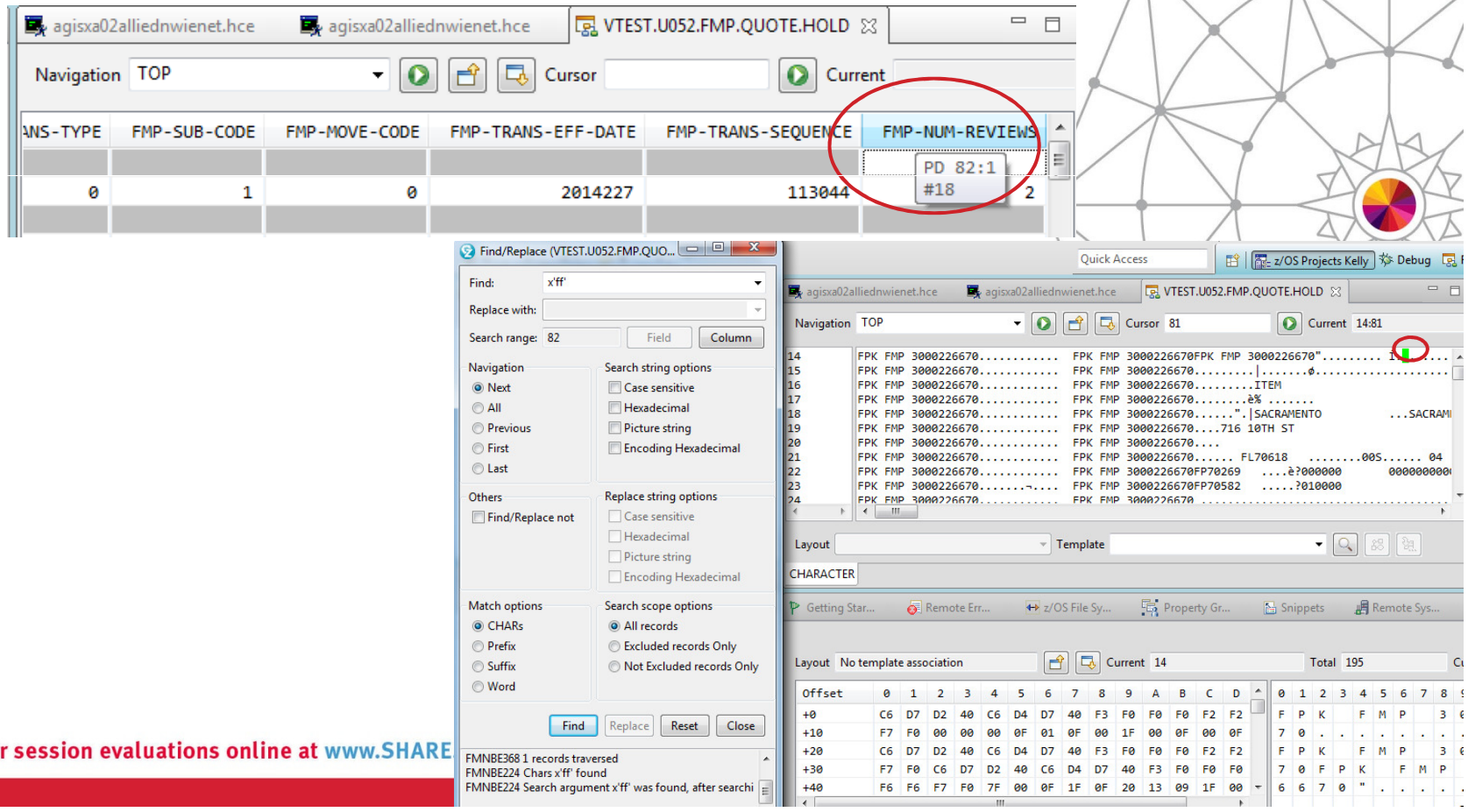
File Manager: Open a file with a copybook



- Select Single Mode →

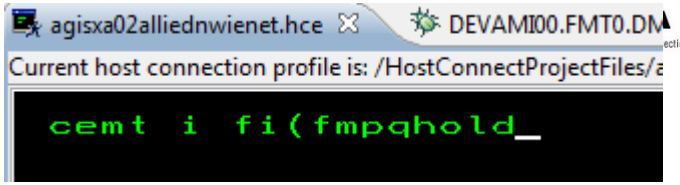
File Manager: Find the offending record

- Hover over the FMP-NUM-REVIEWS column to get offset
- FIND (CTRL+SHIFT+F) on x'FF' in column 81

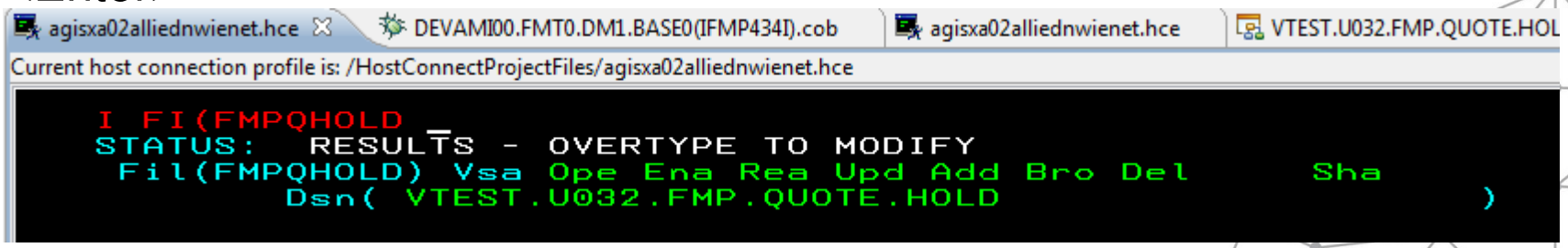


File Manager: Change the Data

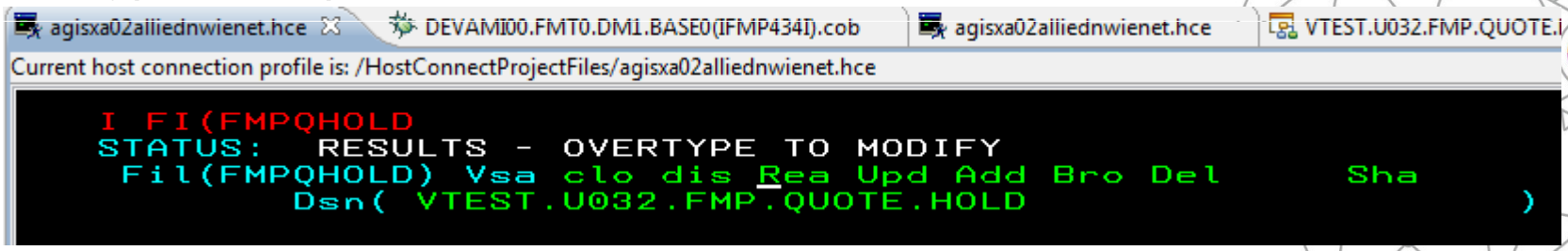
- In the CICS region, close and disable the file, type:



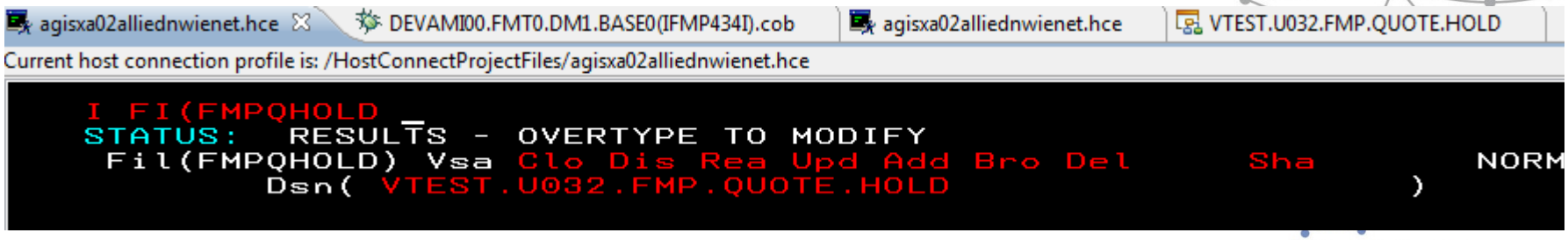
- <Enter>



- Overtype the Ope Ena with clo dis

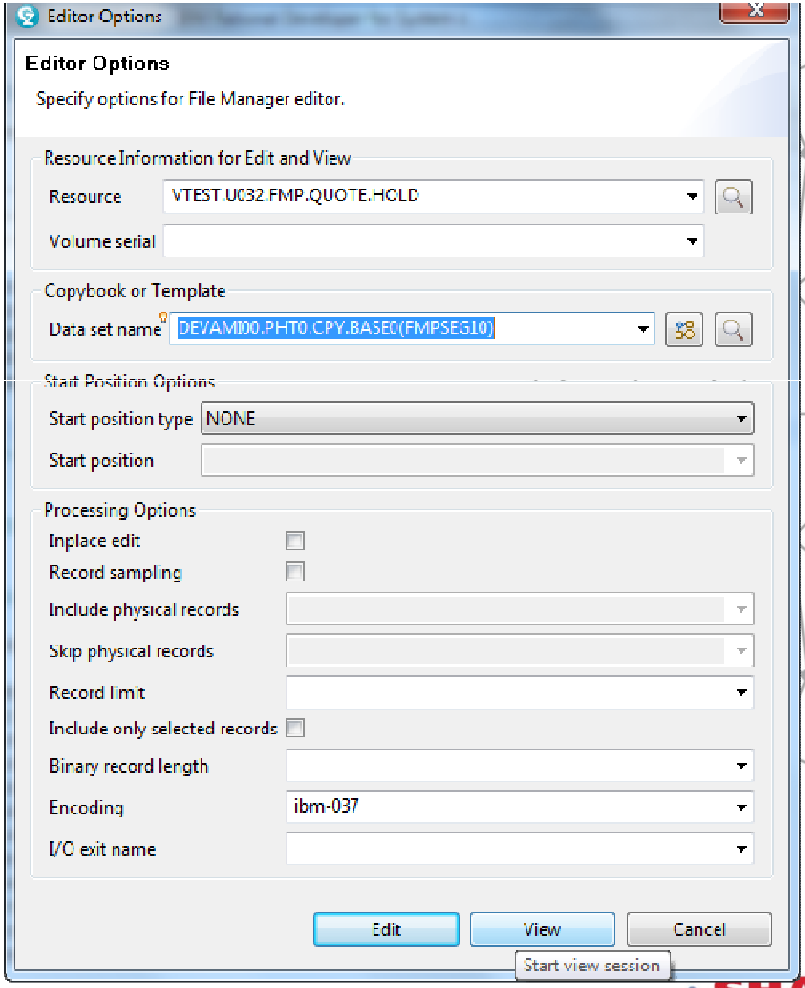


- <Enter>



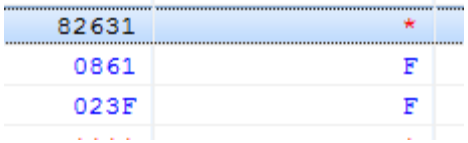
File Manager: Change the Data

- Open in the file in edit mode
- Right-click the file in the Remote Systems Explorer view
- File Manager→ File Manager Editor
- Fill in/select values for Resource & Data set name
- Click <Edit>

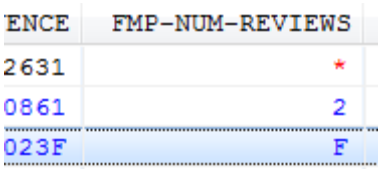


File Manager: Change the Data

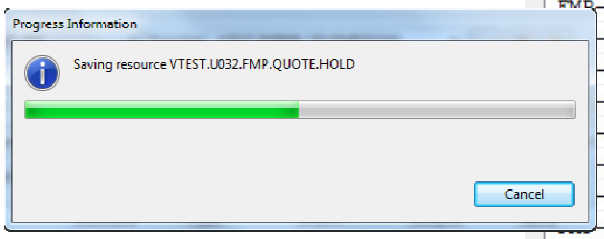
- Right click and select Hex On/Off

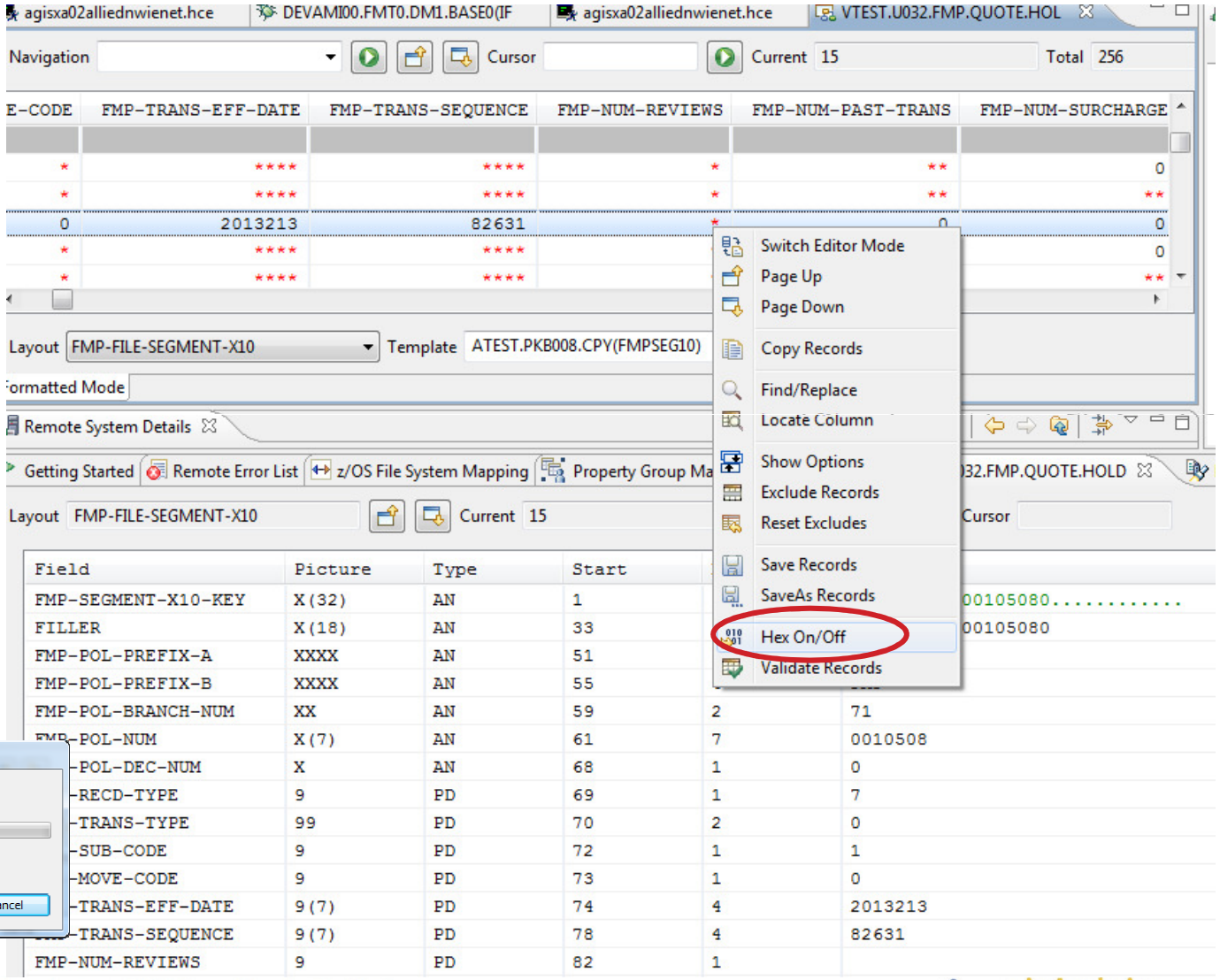


- Overtype to edit



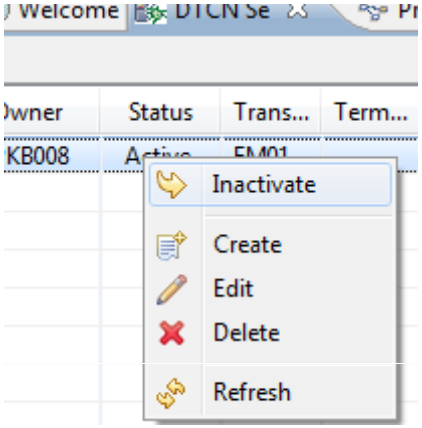
- <Ctrl>+S to save





Test

- Tip: If the DTCN profile is still set up to stop in the program, you may want to inactivate:



- Open Enable the file:

```
I FI(FMPQHOLD _
STATUS:   RESULTS - OVERTYPE TO MODIFY
 Fil(FMPQHOLD) Vsa Ope Ena Rea Upd Add Bro Del      Sha          NORMAL
        Dsn( VTEST.U032.FMP.QUOTE.HOLD                        )
```

- Run the transaction:

```
          POLICY FPK   FMP  7100010508          DATE 080113          CLAIM
                FARM SYSTEM MENU SCREEN

          ENTER POLICY INFORMATION: PKG PRFX FPK
                                    POL PRFX FMP
                                    POL NO   71 0 0010508
                                    EFF DATE
                               DATE RECEIVED 032313
                            UND APPROVED DATE 032313
                                 PRINT OPTION
                               RETURN TO PAK? N
PLACE AN 'X' IN FRONT OF THE DESIRED TRANSACTION AND COMPLETE ALL ADDITIONAL
INFORMATION TO THE RIGHT, CORRESPONDING TO THE TRANSACTION.
            INQUIRY                  WORKSHEET
            QUOTE                    QUOTE INQUIRY x
          _ QUOTE UPDATE             WORKSHEET
            QUOTE TO POLICY
            POLICY TO QUOTE
            NEW BUSINESS
            MANUAL TO AUTOMATED
            RENEWAL
            AMENDMENTS               ADJ IND P
            CANCELLATION             ADJ IND    REASON     PRO RATA DATE
            REINSTATEMENTS                   COVERAGE REACTIVATION DATE
            REMOVE FOR MANUAL
            REPRINT FORMS            REPRINT TYPE
            REVIEW PENDING POLICIES/CHANGES
            UPDATE POLICY ON DATA ENTRY FILE
            REISSUE
            PREFIX TRANSFER
            SUMMARY OF AMENDMENTS

CANCEL REASONS              ADJ IND       REPRINT TYPES     PRINT OPTIONS
41 NONRENEWAL (UND)         P PRO RATE    N NEW BUSINESS    A ALL COPIES
42 MID-TERM CANCEL (UND)    S SHORT RATE  C CONVERSION      B INS & AGT COPY
43 NONRENEWAL               F FLAT RATE   R RENEWAL         D ALL EXCEPT
44 CANCEL/REWRITE                         A AMENDMENT         CO COPY
45 NONPAYMENT                             B BLANK           N NO COPIES
46 INSURED'S REQUEST
47 LAPSE                     PRO RATA DATE: MUST BE ENTERED IF
48 MANAGEMENT DECISION       CANCEL REASON 45 OR 47 IS KEYED.
                                                                   FMP0101
```

YEAH!

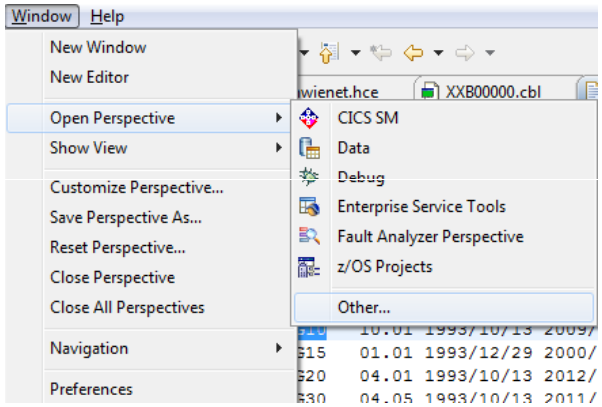
```
          POLICY FPK   FMP  7100010508          DATE 080113          CLAIM
                FARM - GENERAL INFORMATION                             INQRY

INS1 NAME #TESTING
INS2 NAME
STR ADDR   1310 S 14TH ST                                  TRANSFER CODE
CITY       ADEL                  STATE IA   ZIP 500031903  TRANSFER BOOK N
                                                           REMARKS N
POLICY PERIOD FROM 080113 TO 080114   ORIG EFF DT 080113   CLAIMS  N

AGENT ST    VA      AGENT NUM 29813    PROD CODE    001    UND ID      001
BILL CODE   A       PAYOR IND A        GROUP NUM           ACCT NUM
                                       SUSP AMT            SUSP NUM

COMP NUM   001      RATE ST    IA      REINS IND    N
IRPM         %      MPD?       N       COMMISSION CONTRIBUTION                % C
                                       REG COMM        12.0 % LPDP FCTR   7.0 % C
                                       FSC COMM DEV         %

LIABILITY? Y        LIAB ST    IA
FARM TYPE  FARM                        NUM MEMOS    00      PRINT OPTN D
CUST TYPE  CC
SIC CODE           SIC DESC
PREVIOUS POLICY NUMBER

MEMBERSHIP INFO:   DISCOUNT? N         MEMBER CODE
EARTHQUAKE INFO:   INCLUDED? N         DEDUCT PCT   00      LIMITED?   N
TRANSFER   INFO:   FACTOR          %   NUM YEARS

REVIEW INFO:    REVIEW 60    REVIEW  050314   IS REVIEW Y
                CODE   66    REMOVAL 050318   RECURRING Y
                             DATE             (Y/N)

POL END CITY TAX $     $0.00      POL END CNTY TAX $     $0.00
   STATUS INFO          LAST ACTIVITY          NEXT ACTIVITY       NEW/  NO TIMES
  DATE   CODE PREV    CODE    DATE   TERMID    CODE    DATE         REN   RENEWED
08/01/13   J        70010 03/11/13 LW41                              N      00

AGENT CATALYST TEST AGENT                      SURCHARGE/ TOTAL   ADDL/RETURN
INFO  COLUMBUS VA              35434           ASSESSMENT PREMIUM    PREMIUM
AGENT TRFR INFO? N        757 575-7575         $0.00      $ 76,055 $     0.00
SUR EXEMPT  N SURC IND? N
PAK READ ERROR FOR CSC IND
NEXT PANEL NA   001   NA=INSD AI=ADIN LD=LEGL LC=LIAB PR=PROP LH=LOSS    FMP0201
```

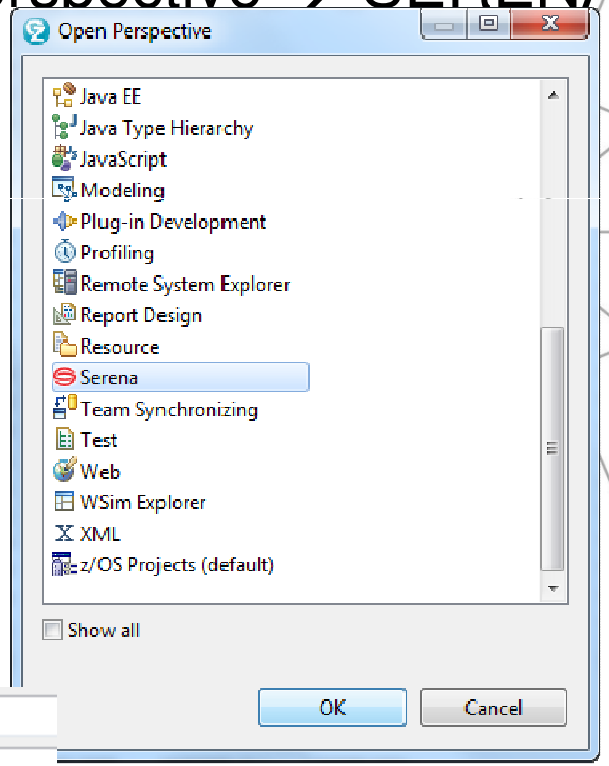
COBOL Mainframe Modernization - DEMO

- Part 1: RDz Working CICS Transaction
- Part 2: The ABEND
- Part 3: Analysis
  - Fault Analyzer – where it happened (program)
  - Debug – why it happened (drill down)
- Part 4: The Fix
  - RAA – find a copybook for a file
  - File Manager – view/edit the file (fix bad data)
- Part 5: What if it requires a code change?
  - ChangeMan

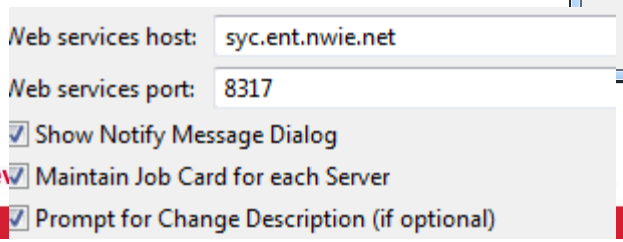
ChangeMan: Accessing ChangeMan

- If I need to change the code, I have to use ChangeMan
- It is just another perspective: SERENA
- Go to Windows→ Open Perspective → SERENA



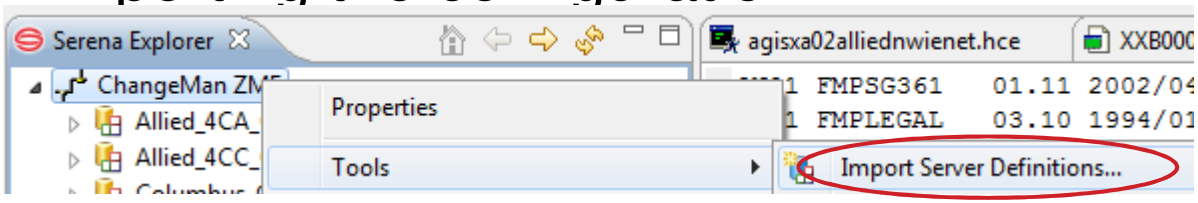


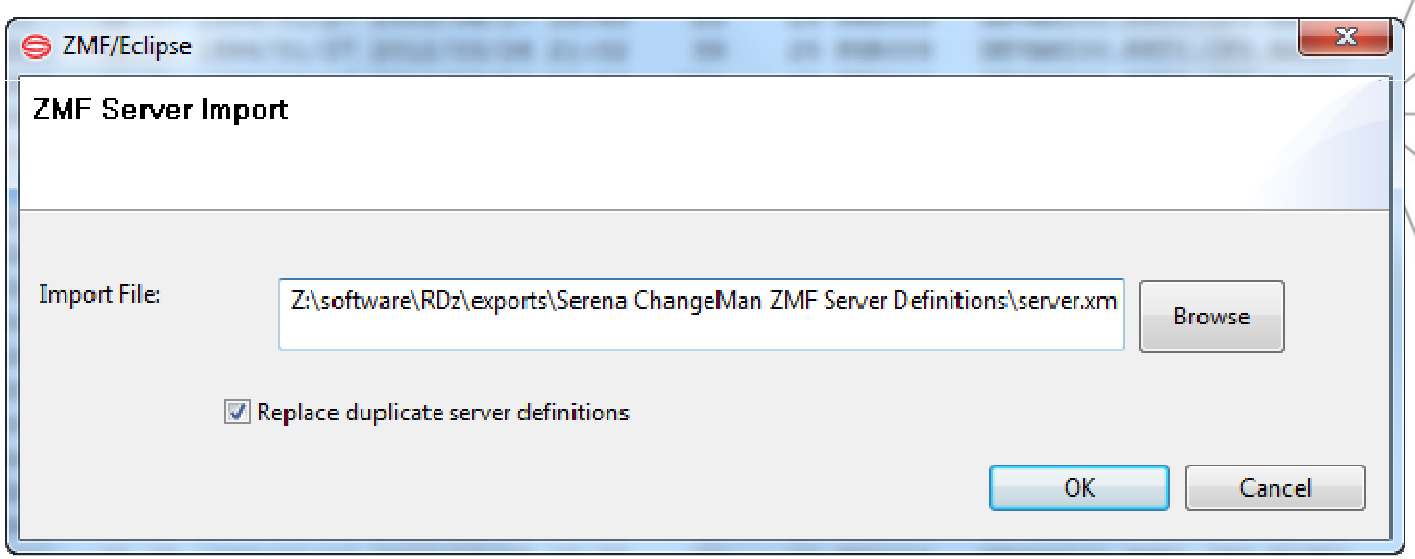
- TIP: Make sure RDz is pointing to the right server/port. Go to Windows → Preferences → zMFEclipse → Settings:



ChangeMan: Accessing ChangeMan

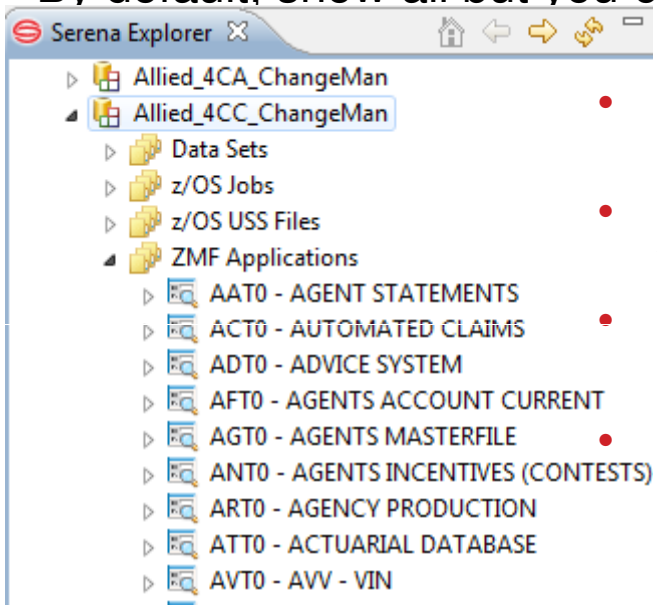
- (if not already done) Quickly set up ChangeMan Servers by importing the configuration:



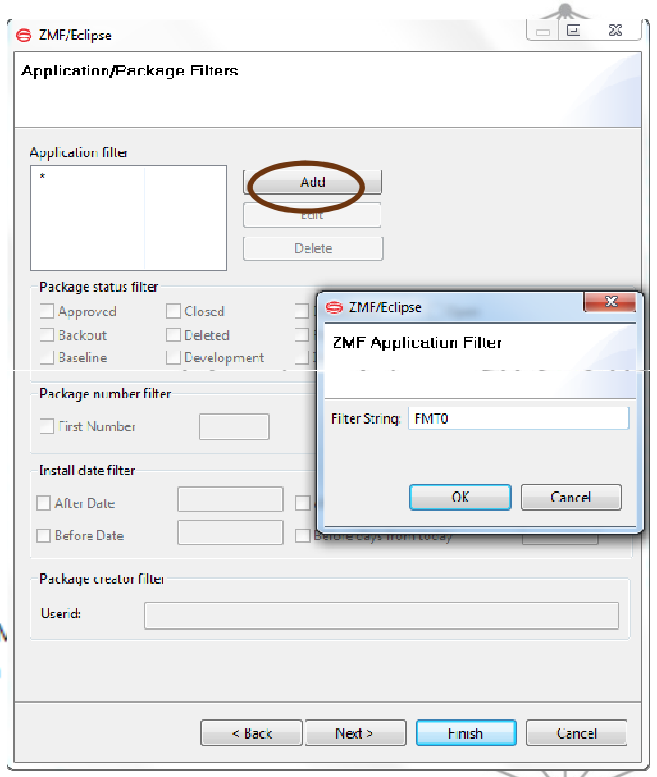


ChangeMan: Filters

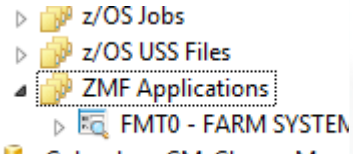
- Expand the ChangeMan ZMF Server you need → ZMF Applications
- By default, show all but you can filter



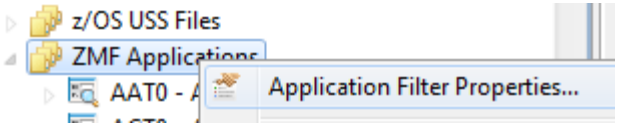
- Add the ChangeMan application
- Tip: Delete the * or you will still get them all!
- Click <Finish>



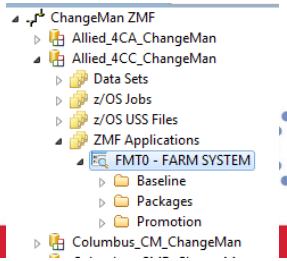
- Cleaner:



- Right-click the ZMF Applications folder → Application Filter Properties…

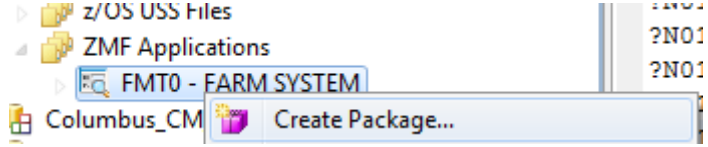


- View all baseline code, packages and promotion (these can be filtered, too)

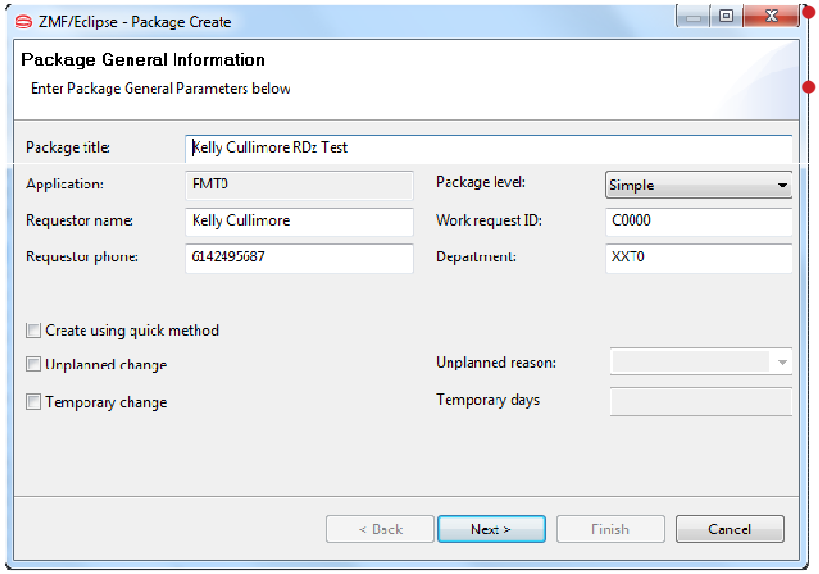


ChangeMan: Package

- Create a package:

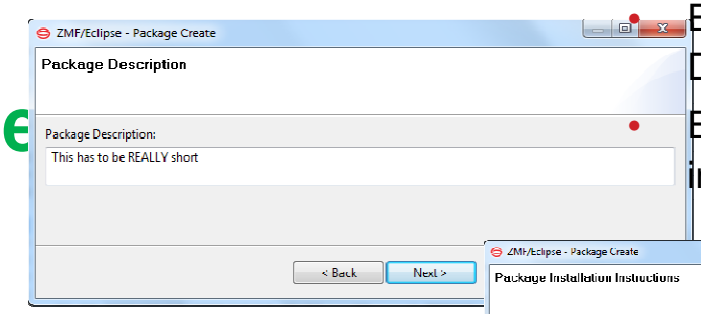


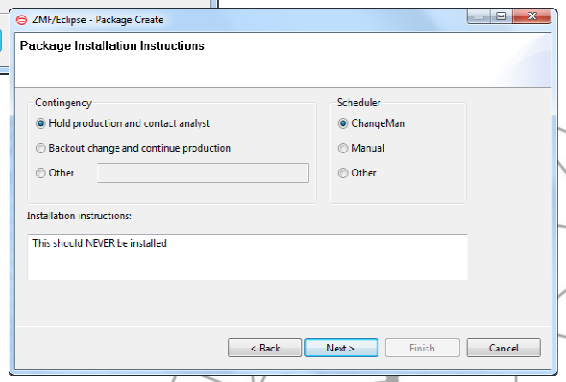
- Click <Next >



Enter Package Description, <Next>

Enter Installation instructions, <Next>

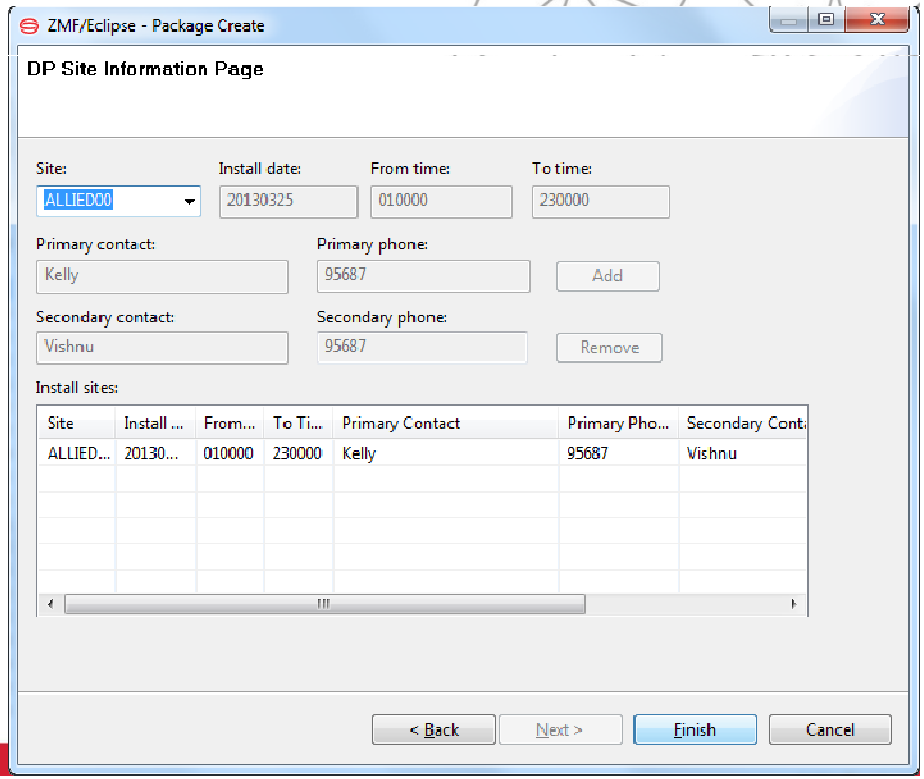




- Enter Site Information

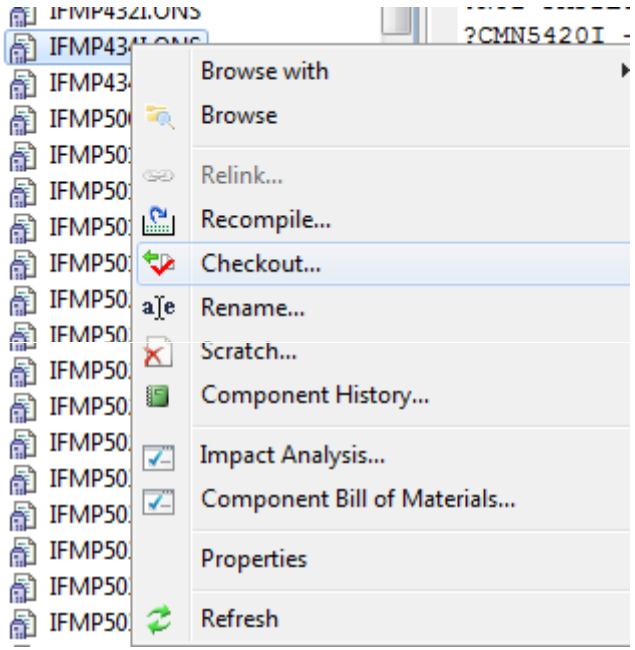
Click <Add>

Click <Finish>

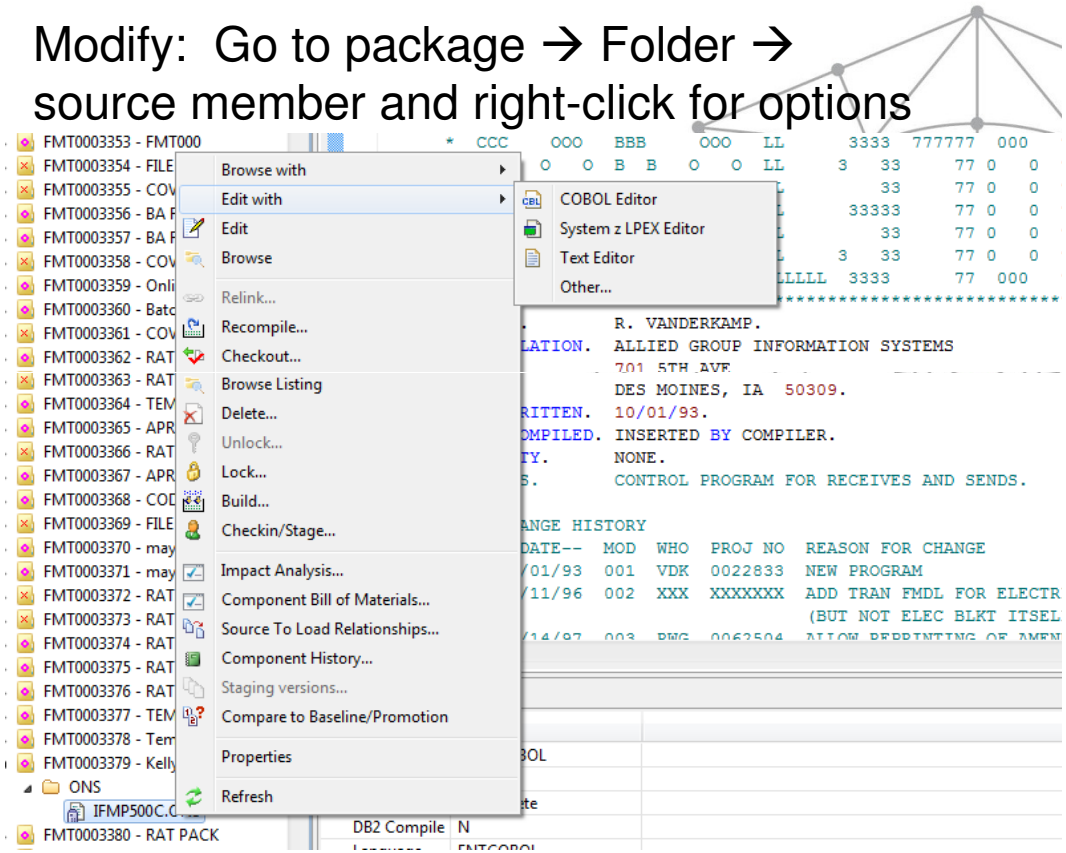


ChangeMan: Members

- Checkout: Baseline → ONS → IFMP434I → Right-click → Checkout

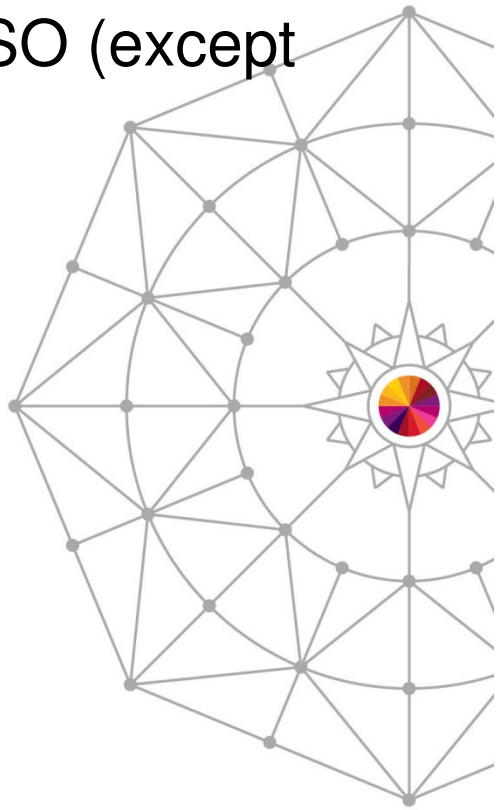


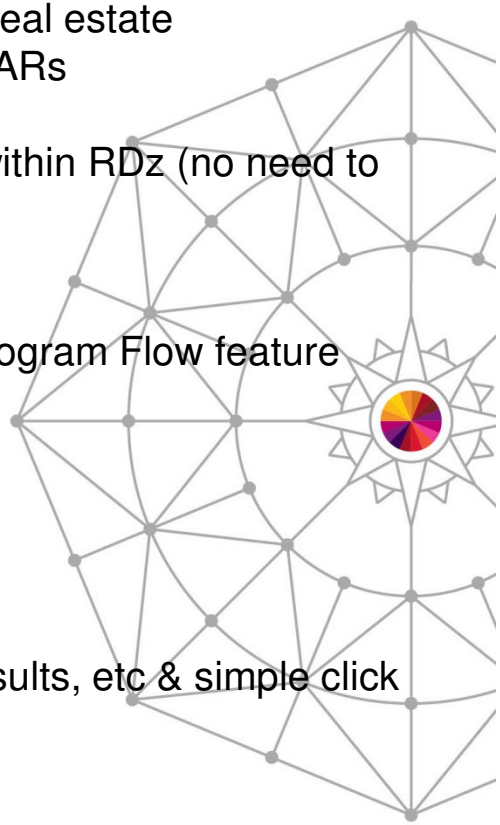
- Modify: Go to package → Folder → source member and right-click for options



ChangeMan: General Usage

- All the same functions available in RDz as TSO (except ERO)
- Right-click and follow the prompts



Recap of a few cool features discussed

- General
  - See more, do more (less swapping, paging) - maximized desktop real estate
  - RSE: No XCOMing files - Drag and Drop – connect to multiple LPARs
  - RSE/MVS Files: Don't have to remember data sets - Filters
  - z/OS ProjectsView: Documentation/Websites - all can be viewed within RDz (no need to ever leave!)
  - z/OS Projects View: Local Development (for specific use cases)
- Analysis
  - Program flow analytics made easy - Visual Program Control via Program Flow feature (also have RAA plug in)
  - Click navigation
  - Search
- Debug
  - Program analysis and navigation
    - All references to occurrences – SUPER COOL
  - See everything – source, outline, breakpoints, monitors, search results, etc & simple click navigation
- Editor
  - Expand/collapse sections/programs – outline navigation
  - Opening a copybook is EASY (don't have to look up library, swap, 3.4, just (highlight <F3>)
  - No more waiting for the compiler for syntax errors - Real-time editor (LPEX)