IET Product Update
November 2012

Agenda

- ▲ Product Overview
- ▲ Release 8.0
- ▲ Release 8.1
- ▲ VerifIEr
- ▲ pathvIEw
- ▲ WebCR
- ▲ Q&A

IET Products

GuardIEn
Life-Cycle Management

VerifIEr
Automated QA

XOS
Manage External Objects

xTrace
Advanced tracing for z/OS

Assistants
Developer Productivity Tools

IETeGUI
Gen GUI Enhancer

Object List+
Encyclopaedia Browsing

pathvIEw
Code Coverage Testing

genIE
Direct PAD Editing & Plug-ins

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Release 8.0

- ▲ Gen r8 support
- ▲ Auditing
- ▲ Change Analysis
- ▲ Show/Explain SQL
- ▲ Virtual XOs
- ▲ Object List+ Custom Functions via Dynamic SQL
- ▲ Tutorial

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Release 8.1

- ▲ Available July 2011
- ▲ New Features
  - ▲ CSE Parallel Generation
  - ▲ CR Rework Manager
  - ▲ ISPW Interface
- ▲ Major Enhancements
  - ▲ Location Updating
  - ▲ XOS
- ▲ Built with Gen 8.0
  - ▲ Multi Row Fetch performance improvements
  - ▲ Dynamic RI for z/OS
- ▲ Still supports Gen 6.* and Gen 7.*

OL+ Impact Wizard

▲ Available in 8.1.2

Object List + Enhancements

▲ Release 8.1.3

   ▲ Multiple Model Searching

   ▲ Multiple Type Searching

   ▲ Compare PAD Ency vs. Toolset

   ▲ Compare GUI Designs

Quiz 1

```
ADD_OR_EDIT_EMPLOYEE
    IMPORTS: ...
    EXPORTS:
    LOCALS: ...
    ENTITY ACTIONS: ...

    IF local_director_or_manager ief_supplied flag IS EQUAL TO "Y"
        IF in employee telephone IS EQUAL TO SPACES
        EXIT STATE IS must_have_director_phone_number
    ESCAPE
```

View is not populated

```
ADD_OR_EDIT_EMPLOYEE
    IMPORTS: ...
    EXPORTS: :
    LOCALS: ...
    ENTITY ACTIONS: ...

NOTE History
    2    DPANAHY  2011-09-02 TUTOR001          1

READ db job_role
    WHERE DESIRED db job_role code IS EQUAL TO in job_role code
WHEN successful
    IF in employee leaving_date IS NOT EQUAL TO datenum(0)
        IF in job_role code IS EQUAL TO "ADMIN"
            EXIT STATE IS cannot_be_admin_if_leaving
        ESCAPE
        ELSE
            IF in employee leaving_date IS LESS OR EQUAL TO CURRENT_DATE
                IF in employee status IS NOT EQUAL TO "T"
                    EXIT STATE IS must_terminate_if_leaving_date
                ESCAPE

    ELSE
        IF in employee status IS EQUAL TO "T"
            EXIT STATE IS must_set_leaving_date
        ESCAPE

    IF temp_director_or_manager ief_supplied flag IS EQUAL TO "Y"
        IF in employee status IS EQUAL TO "D"
            IF in employee telephone IS EQUAL TO SPACES
                EXIT STATE IS must_have_director_phone_number
            ESCAPE

            IF in employee address_line_1 IS EQUAL TO SPACES
                AND in employee address_line_2 IS EQUAL TO SPACES
                EXIT STATE IS must_have_director_address
            ESCAPE

    IF in_add_mode ief_supplied flag IS EQUAL TO "Y"
        CREATE db employee
        SET id TO in employee id
        SET password TO in employee password
        SET name TO in employee name
        SET telephone TO in employee telephone
        SET sort_code TO in employee sort_code
        SET account_number TO in employee account_number
        SET address_line_1 TO in employee address_line_1
        SET address_line_2 TO in employee address_line_2
        SET address_line_3 TO in employee address_line_3
        SET status TO in employee status
        SET join_date TO in employee join_date
        SET leaving_date TO in employee leaving_date
        ASSOCIATE  WITH db job_role WHICH defines_position_of IT
        WHEN successful
        WHEN already exists
            EXIT STATE IS ae

        EXIT STATE IS create_ok
        ELSE
            READ db employee
                WHERE DESIRED db employee id IS EQUAL TO in employee id
            WHEN successful

                IF in employee status IS EQUAL TO "T"
                    OR in employee status IS EQUAL TO "P"
                    READ db store
                        WHERE DESIRED db store has_manager CURRENT db employee
                    WHEN successful
                        CASE OF in employee status
                        CASE "T"
                            EXIT STATE IS cannot_terminate_store_manager
                        ESCAPE
                        CASE "P"
                            EXIT STATE IS manager_cannot_be_parttime
                        ESCAPE
                        OTHERWISE

                    WHEN not found

                READ db_previous job_role
                    WHERE DESIRED db_previous job_role defines_position_of CURRENT db
                WHEN successful
                    UPDATE db employee
                    SET password TO in employee password
                    SET name TO in employee name
                    SET telephone TO in employee telephone
                    SET sort_code TO in employee sort_code
                    SET account_number TO in employee account_number
                    SET address_line_1 TO in employee address_line_1
                    SET address_line_2 TO in employee address_line_2
                    SET address_line_3 TO in employee address_line_3
                    SET status TO in employee status
                    SET join_date TO in employee join_date
                    SET leaving_date TO in employee leaving_date
                    WHEN successful
                        IF db_previous job_role code IS NOT EQUAL TO db job_role code
                            TRANSFER db employee
                                FROM db_previous job_role WHICH defines_position_of IT
                                TO db job_role WHICH defines_position_of IT

                        EXIT STATE IS update_ok
                    WHEN not unique
                        EXIT STATE IS ae

                WHEN not found
                    EXIT STATE IS nf

            WHEN not found
                EXIT STATE IS nf

WHEN not found
    EXIT STATE IS nf
```

Quiz 2

```
READ EACH db employee
         db job_role
     SORTED BY ASCENDING db job_role code
     SORTED BY ASCENDING db employee id
     WHERE DESIRED db employee has_position_defined_by DESIRED db job_role
     AND DESIRED db job_role code IS EQUAL TO "A"
     OR DESIRED db job_role code IS EQUAL TO "S"
```

could
mean
this…

```
READ EACH db employee
         db job_role
     SORTED BY ASCENDING db job_role code
     SORTED BY ASCENDING db employee id
     WHERE DESIRED db employee has_position_defined_by DESIRED db job_role
     AND (DESIRED db job_role code IS EQUAL TO "A"
     OR DESIRED db job_role code IS EQUAL TO "S")
```

or
this…

```
READ EACH db employee
         db job_role
     SORTED BY ASCENDING db job_role code
     SORTED BY ASCENDING db employee id
     WHERE (DESIRED db employee has_position_defined_by DESIRED db job_role
     AND DESIRED db job_role code IS EQUAL TO "A")
     OR DESIRED db job_role code IS EQUAL TO "S"
```

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```
READ EACH db_another task
    WHERE DESIRED db_another task executes_on CURRENT db encyclopaedia
    AND (DESIRED db_another task status IS EQUAL TO "S"
    OR DESIRED db_another task status IS EQUAL TO "R")
    AND ((DESIRED db_another task from_model_id IS EQUAL TO temp_this task from_model_id
    AND (DESIRED db_another task type IS EQUAL TO "U"
    OR DESIRED db_another task type IS EQUAL TO "L"
    OR DESIRED db_another task type IS EQUAL TO "X"))
    OR (DESIRED db_another task from_model_id IS EQUAL TO temp_this task to_model_id
    AND (DESIRED db_another task type IS EQUAL TO "D"
    OR DESIRED db_another task type IS EQUAL TO "E"
    OR DESIRED db_another task type IS EQUAL TO "U"
    OR DESIRED db_another task type IS EQUAL TO "L"
    OR DESIRED db_another task type IS EQUAL TO "X"
    OR DESIRED db_another task type IS EQUAL TO "V"
    OR DESIRED db_another task type IS EQUAL TO "M"
    OR DESIRED db_another task type IS EQUAL TO "O"
    OR (DESIRED db_another task type IS EQUAL TO "G"
    AND DESIRED db_another task integer_parm_1 IS EQUAL TO 21
    OR DESIRED db_another task integer_parm_1 IS EQUAL TO 22
    OR DESIRED db_another task integer_parm_1 IS EQUAL TO 31
    OR DESIRED db_another task integer_parm_1 IS EQUAL TO 51
    OR DESIRED db_another task integer_parm_1 IS EQUAL TO 52
    OR DESIRED db_another task integer_parm_1 IS EQUAL TO 53
    OR DESIRED db_another task integer_parm_1 IS EQUAL TO 30)))
    OR (DESIRED db_another task to_model_id IS EQUAL TO temp_this task from_model_id
    AND (DESIRED db_another task type IS EQUAL TO "M"
    OR DESIRED db_another task type IS EQUAL TO "O"
    OR (DESIRED db_another task type IS EQUAL TO "G"
    AND (DESIRED db_another task integer_parm_1 IS EQUAL TO 22
    OR DESIRED db_another task integer_parm_1 IS EQUAL TO 52
    OR DESIRED db_another task integer_parm_1 IS EQUAL TO 31))))
    OR (DESIRED db_another task to_model_id IS EQUAL TO temp_this task to_model_id
    AND (DESIRED db_another task type IS EQUAL TO "M"
    OR DESIRED db_another task type IS EQUAL TO "O"
    OR (DESIRED db_another task type IS EQUAL TO "G"
    AND (DESIRED db_another task integer_parm_1 IS EQUAL TO 22
    OR DESIRED db_another task integer_parm_1 IS EQUAL TO 52
    OR DESIRED db_another task integer_parm_1 IS EQUAL TO 31)))))
```

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Automated code checking and QA for CA Gen

What is VerifIEr?

▲ Automated, configurable QA tool for ensuring that CA Gen models are compliant with site standards

Production
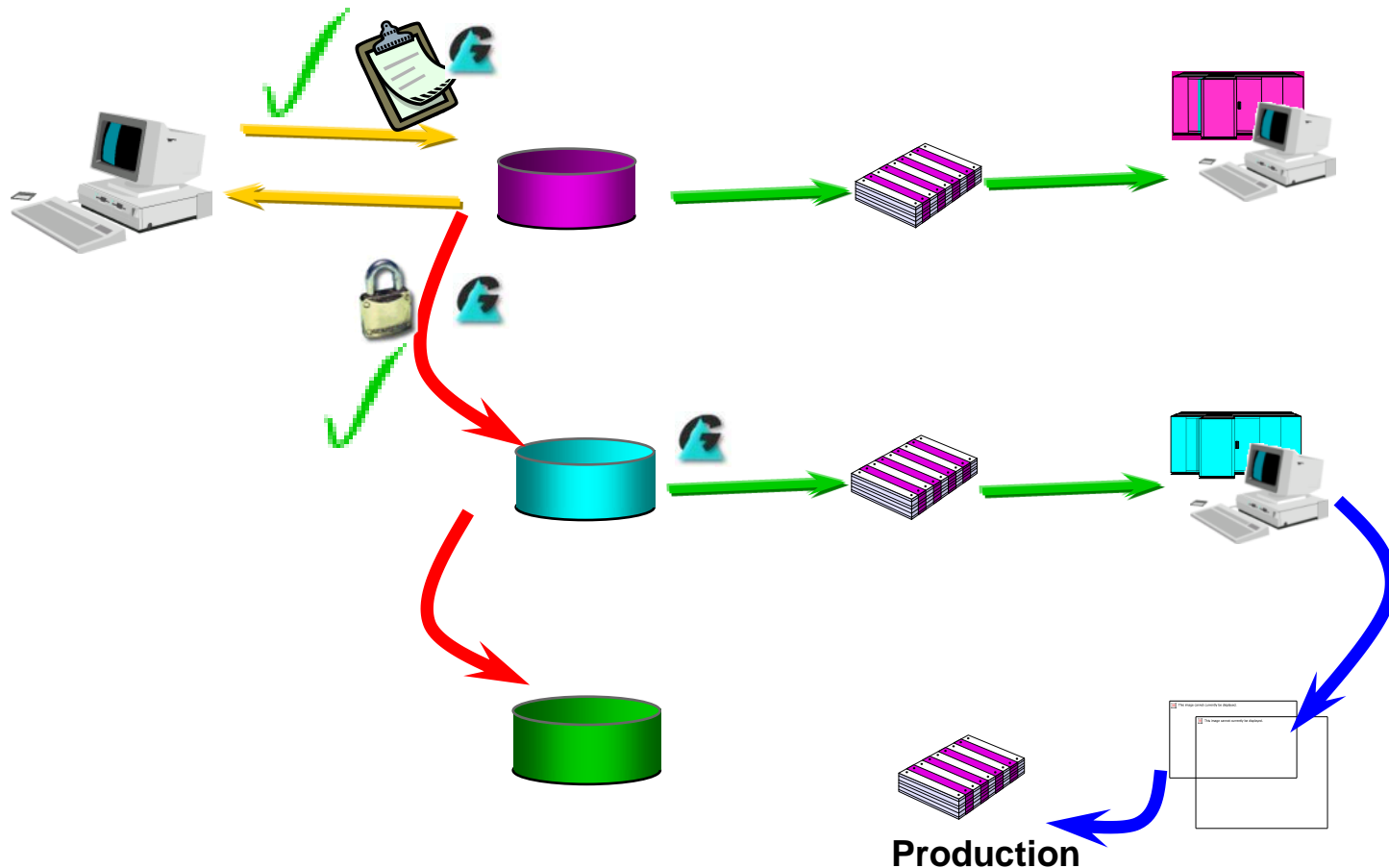
Standard Checks

- ▲ Developed and Maintained by IET
  - ▲ >150 checks currently available
- ▲ Examples
  - ▲ Naming Standards
    - ▲ Action Blocks, Views, Packaging, etc.
  - ▲ Coding Standards
    - ▲ Return code checking, group view types, etc.
  - ▲ CBD Architecture Standards
    - ▲ Tiering, Standards, etc.
  - ▲ User Interface Standards
    - ▲ Help Ids, Tab Sequencing, Colours, Sizes, etc.
  - ▲ Audit Checks
    - ▲ Compliance checks
  - ▲ Performance
    - ▲ READ Efficiency, Perfect View Matching, Use of Functions, etc.
  - ▲ Error Detection
    - ▲ Unpopulated views, Ambiguous OR, Invalid view mapping

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Integrated into the Development Process

- ▲ Enables checks to be easily performed at key points in the development life-cycle
  - ▲ On Upload
  - ▲ CR Status Change
  - ▲ Pre Migrate
  - ▲ System Update Step
- ▲ Verification can be made mandatory
- ▲ Toolset Plug-in
  - ▲ Allows verification prior to upload

Automated Fixing with genIE

▲ VerifIEr contains integration with genIE

    ▲ Enables automatic fixing of certain errors

    ▲ Examples:

        ▲ Delete Unused Views

        ▲ Re-order Views

        ▲ Multi-row Fetch

        ▲ Convert READs to use IN & BETWEEN

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```
READ EACH db_another task
        WHERE DESIRED db_another task executes_on CURRENT db encyclopaedia
        AND (DESIRED db_another task status IS EQUAL TO "S"
        OR DESIRED db_another task status IS EQUAL TO "R")
        AND ((DESIRED db_another task from_model_id IS EQUAL TO temp_this task from_model_id
        AND (DESIRED db_another task type IS EQUAL TO "U"
        OR DESIRED db_another task type IS EQUAL TO "L"
        OR DESIRED db_another task type IS EQUAL TO "X"))
        OR (DESIRED db_another task from_model_id IS EQUAL TO temp_this task to_model_id
        AND (DESIRED db_another task type IS EQUAL TO "D"
        OR DESIRED db_another task type IS EQUAL TO "E"
        OR DESIRED db_another task type IS EQUAL TO "U"
        OR DESIRED db_another task type IS EQUAL TO "L"
        OR DESIRED db_another task type IS EQUAL TO "X"
        OR DESIRED db_another task type IS EQUAL TO "V"
        OR DESIRED db_another task type IS EQUAL TO "M"
        OR DESIRED db_another task type IS EQUAL TO "O"
        OR (DESIRED db_another task type IS EQUAL TO "G"
        AND DESIRED db_another task integer_parm_1 IS EQUAL TO 21
        OR DESIRED db_another task integer_parm_1 IS EQUAL TO 22
        OR DESIRED db_another task integer_parm_1 IS EQUAL TO 31
        OR DESIRED db_another task integer_parm_1 IS EQUAL TO 51
        OR DESIRED db_another task integer_parm_1 IS EQUAL TO 52
        OR DESIRED db_another task integer_parm_1 IS EQUAL TO 53
        OR DESIRED db_another task integer_parm_1 IS EQUAL TO 30)))
        OR (DESIRED db_another task to_model_id IS EQUAL TO temp_this task from_model_id
        AND (DESIRED db_another task type IS EQUAL TO "M"
        OR DESIRED db_another task type IS EQUAL TO "O"
        OR (DESIRED db_another task type IS EQUAL TO "G"
        AND (DESIRED db_another task integer_parm_1 IS EQUAL TO 22
        OR DESIRED db_another task integer_parm_1 IS EQUAL TO 52
        OR DESIRED db_another task integer_parm_1 IS EQUAL TO 31))))
        OR (DESIRED db_another task to_model_id IS EQUAL TO temp_this task to_model_id
        AND (DESIRED db_another task type IS EQUAL TO "M"
        OR DESIRED db_another task type IS EQUAL TO "O"
        OR (DESIRED db_another task type IS EQUAL TO "G"
        AND (DESIRED db_another task integer_parm_1 IS EQUAL TO 22
        OR DESIRED db_another task integer_parm_1 IS EQUAL TO 52
        OR DESIRED db_another task integer_parm_1 IS EQUAL TO 31)))))
```

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Enhanced with genIE

```
⊢ READ EACH db_another task
        WHERE DESIRED db_another task executes_on CURRENT db encyclopaedia
        AND DESIRED db_another task status IS IN ("S", "R")
        AND ((DESIRED db_another task from_model_id IS EQUAL TO temp_this task from_model_id
        AND DESIRED db_another task type IS IN ("U", "L", "X"))
        OR (DESIRED db_another task from_model_id IS EQUAL TO temp_this task to_model_id
        AND (DESIRED db_another task type IS IN ("D", "E", "U", "L", "X", "V", "M", "O")
        OR (DESIRED db_another task type IS EQUAL TO "G"
        AND DESIRED db_another task integer_parm_1 IS IN (21, 22, 31, 51, 52, 53, 30))))
        OR (DESIRED db_another task to_model_id IS EQUAL TO temp_this task from_model_id
        AND (DESIRED db_another task type IS IN ("M", "O")
        OR (DESIRED db_another task type IS EQUAL TO "G"
        AND DESIRED db_another task integer_parm_1 IS IN (22, 52, 31))))
        OR (DESIRED db_another task to_model_id IS EQUAL TO temp_this task to_model_id
        AND (DESIRED db_another task type IS IN ("M", "O")
        OR (DESIRED db_another task type IS EQUAL TO "G"
        AND DESIRED db_another task integer_parm_1 IS IN (22, 52, 31)))))
```

Benefits

- ▲ Automated checking reduces time & effort spent on verification
- ▲ Checks can be performed multiple times, thus catching errors early
- ▲ Verification on upload provides immediate notification of errors.
- ▲ Toolset plug-in allows checking before upload
- ▲ Checks can be performed by non-experts
- ▲ Enables checks that would be impractical to perform manually

pathvIEw
The path to testing success for CA Gen

pathvIEw
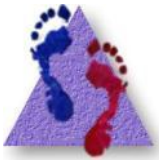
- ▲ Code Coverage Introduction
- ▲ pathvIEw Overview
- ▲ Demonstration

Software Testing

▲ Functional Testing

　▲ Compare behaviour against requirements

　▲ Black-box

▲ Structural Testing

　▲ Compare behaviour against intention of source code

　▲ White-box

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Code Coverage Introduction
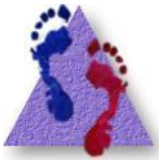
▲ Structural Testing

   ▲ Does not replace the need for Functional Testing

▲ One of the earliest forms of software testing and widely practiced and accepted

▲ Simple coverage metric : Coverage %

   ▲ 0% - no statements have been executed

   ▲ 100% - all statements have been executed

   ▲ Measure of quality of testing, not quality of software
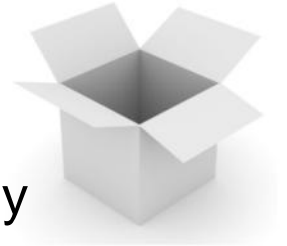
Code Coverage Testing

▲ Code Coverage process

    ▲ Determine areas of code not executed during testing

    ▲ Identify why code not executed

    ▲ Create additional test cases to increase coverage

▲ Helpful *additional* testing tool

    ▲ Code coverage tools are "only helpful if they're used to *enhance* thought, not *replace* it" Brian Marick

▲ Do not always need 100% coverage
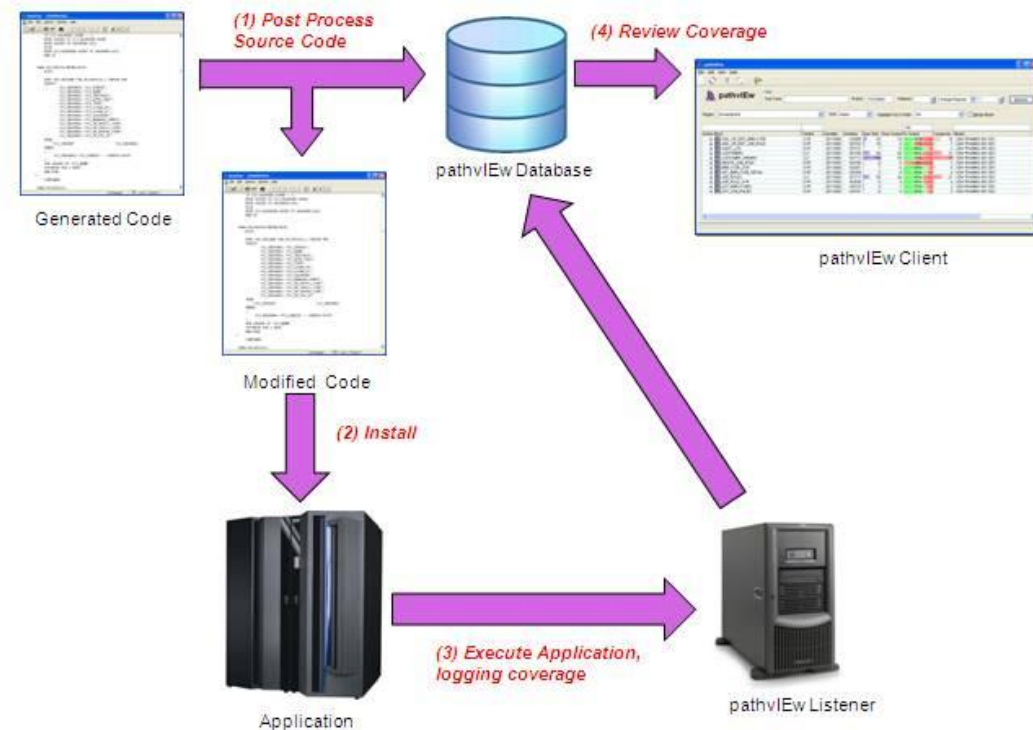
    ▲ but less than 80% should be worrying…

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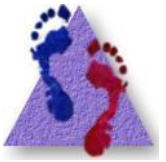
pathvIEw

- ▲ Statement level code coverage for CA Gen generated code
    - ▲ Procedure Step Action Diagram
    - ▲ Action Block
- ▲ Support for major target environments
    - ▲ MVS/Cobol
    - ▲ Windows/C
    - ▲ UNIX/C
    - ▲ Java
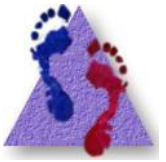- ▲ Support for Gen 6.5, 7.6 and 8.0

pathvIEw Architecture

▲ Generate standard source code (C, COBOL, Java, etc.)
▲ Source code post processed
  ▲ Adds data collection logic
▲ Execute application
  ▲ Coverage data sent to Listener
  ▲ Results stored in database
▲ pathvIEw Client to review results

Generated Code

(1) Post Process Source Code

pathvIEw Database

(4) Review Coverage

pathvIEw Client

Modified Code

(2) Install

Application

(3) Execute Application, logging coverage

pathvIEw Listener

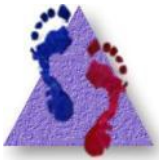# pathvIEw Features

▲ Does not alter behaviour of generated code

▲ Low runtime overhead

   ▲ Negligible overhead for memory and CPU

▲ Simple TCP/IP communications

   ▲ Multi-threaded Listener

▲ Integration with GuardIEn

   ▲ View code coverage by CR, Release, Release Pack, System Update, etc.

Benefits

▲ Identifies untested code

▲ Ensure changed modules are thoroughly tested

▲ Helps identify redundant code

Q&A

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