



| z/TPF V1.1

# TPF Users Group - 2011 Code Coverage in TPF Toolkit

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# Agenda

- **“How effective are our tests?”**
- **Judging the effectiveness of tests**
- **Code Coverage in TPF Toolkit**
  - Creating code coverage sessions
  - Collecting coverage data
  - Analyzing coverage data
  - Viewing coverage results
- **Demo**
- **Questions**

## “How effective are our tests?”

- **Common question among developers, quality management teams, release managers, etc.**
  - Developers: unit test specific portions of code related to new features (generally limited to a few modules)
  - Quality management teams: test larger components/features of a product (generally covering thousands of modules)

Ultimately, *more effective testing* leads to *higher quality end products*.

## Judging the effectiveness of tests

- **A useful measure of the effectiveness of tests is the *coverage* of the tests**
  - Of the code that is meant to be tested, how much is *actually executed* in response to test programs?
- **Increased confidence in results of tests if they cover a significant portion of the code that is being tested**
  - This provides increased confidence in quality of product

## Code Coverage in TPF Toolkit

- **Code Coverage tool released with TPF Toolkit v3.6 (requires TPF APAR PJ37973, included in PUT 8)**
  - Allows users to measure the coverage of their TPF applications in response to test transactions
  - Coverage is measured at different levels:
    - Module level (e.g. QDB0)
    - Object level (e.g. qdb0.o)
    - Function level (e.g. printf(...))
  - Code coverage data is collected per module not transaction
  - Source level coverage data was unavailable

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## Code Coverage in TPF Toolkit

- **Code Coverage source analysis will be available in TPF Toolkit v3.6.3**
  - Requires TPF APAR PJ38995 (included in PUT 8)
  - Allows users to open source files and view executed/non-executed sections of the file



# Creating Code Coverage Sessions

- **Sessions are created using the Code Coverage subsystem for your z/TPF connection in RSE**
  - Provide list of modules for which you would like to collect code coverage data

The screenshot shows a dialog box titled "New Filter" with the subtitle "New Code Coverage Registration Session". The main instruction is "Enter information for code coverage registration". The dialog is divided into several sections:

- Workstation Information:** Contains two text input fields: "Workstation name" and "Workstation TCP/IP address".
- TPF Terminal:** Contains a "Terminal name" text input field and three radio buttons: "UNATA" (selected), "IP Address", and "LU Name".
- Program Mask:** This section is highlighted with a red border. It contains two empty text input fields for listing modules, with "Add" and "Remove" buttons to the right.
- Note:** A note below the Program Mask section states: "Code coverage details will only be collected for the programs specified in the list above."
- User token:** A text input field.
- Code Coverage Settings:** Contains two text input fields: "Subsystem Name (optional)" and "Root Save Directory Name (optional)". Below these is an example: "Example: Specify 'tmp' to save code coverage data in '/tmp'." There are also two unchecked checkboxes: "Automatically Perform Size Analysis" and "Automatically Perform Source Analysis".

At the bottom of the dialog, there are four buttons: a help icon (?), "< Back", "Next >", and "Cancel".



# Creating Code Coverage Sessions

- **Sessions are created using the Code Coverage subsystem for your z/TPF connection in RSE**
  - Provide list of modules for which you would like to collect code coverage data
  - Specifying a TPF Terminal allows you to limit when coverage data is collected

**New Code Coverage Registration Session**  
Enter information for code coverage registration

Workstation Information  
Workstation name \* Workstation TCP/IP address \*

**TPF Terminal**  
Terminal name  
 LHEATA  IP Address  LUJ Name

Program Mask  
Add Remove

Note: Code coverage details will only be collected for the programs specified in the list above.

User token

Code Coverage Settings  
Subsystem Name (optional):  
Root Save Directory Name (optional):  
Example: Specify 'tmp' to save code coverage data in 'tmp'.

Automatically Perform Size Analysis  
 Automatically Perform Source Analysis

< Back Next > Finish Cancel

# Creating Code Coverage Sessions

- **Sessions are created using the Code Coverage subsystem for your z/TPF connection in RSE**
  - Provide list of modules for which you would like to collect code coverage data
  - Specifying a TPF Terminal allows you to limit when coverage data is collected
  - Option to automatically perform size/source analysis to obtain coverage data at object and function level

**New Code Coverage Registration Session**  
Enter information for code coverage registration.

Workstation Information  
Workstation name \* Workstation TCP/IP address \*

TPF Terminal  
Terminal name  
 UNATA  IP Address  LU Name

Program Mask  
Add Remove

Note: Code coverage details will only be collected for the programs specified in the list above.

User token

Code Coverage Settings  
Subsystem Name (optional):  
Root Save Directory Name (optional):  
Example: Specify 'tmp' to save code coverage data in '/tmp'.

Automatically Perform Size Analysis  
 Automatically Perform Source Analysis

< Back Next > Finish Cancel

## Collecting Coverage Data

- **To collect code coverage data, do the following:**
  - Start collection for code coverage session
    - Optionally, you may enter annotations to be associated with the *timestamp directory* generated for this collection
    - Annotations are plain text and may provide information about the programs that were executed, etc.
  - Run test programs on z/TPF system
  - Save and stop collection for code coverage session

## Analyzing Coverage Data

- **The collected data contains information at the module level only**
- **To obtain coverage information at the object and function level, perform size or **source** analysis on the timestamp directory generated for the collection**
  - Size and **source** analysis can be performed through the Code Coverage subsystem or the TPF Code Coverage view

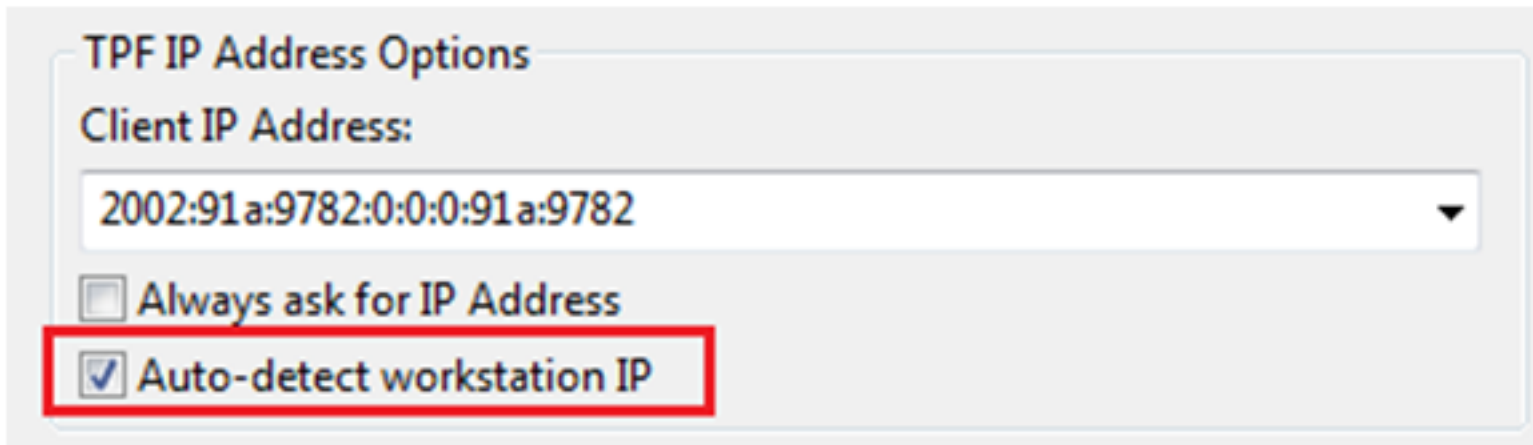
# Viewing Coverage Results

- **After collection and analysis is complete, you can view the code coverage results in the TPF Code Coverage view**
  - You can filter the results to:
    - Show only specific modules by name
    - Show only modules/functions/objects where the size/line percentage lies within a certain range (e.g. only show those modules that are covered < 50% by tests)
  - You can sort the results by size/line percentage or by name
  - You can export the results to a file for further processing (e.g. CSV data, etc.)
  - You can print the results for offline viewing

# Demo – Code Coverage Source Analysis

## Automatic Detection of Workstation IP address

- **New feature allows TPF system to determine client workstation IP address automatically**
  - Requires TPF APAR PJ38995 (included in PUT 8)
  - Determined by preference setting on **TPF Toolkit** preference page



TPF IP Address Options

Client IP Address:

2002:91a:9782:0:0:0:91a:9782

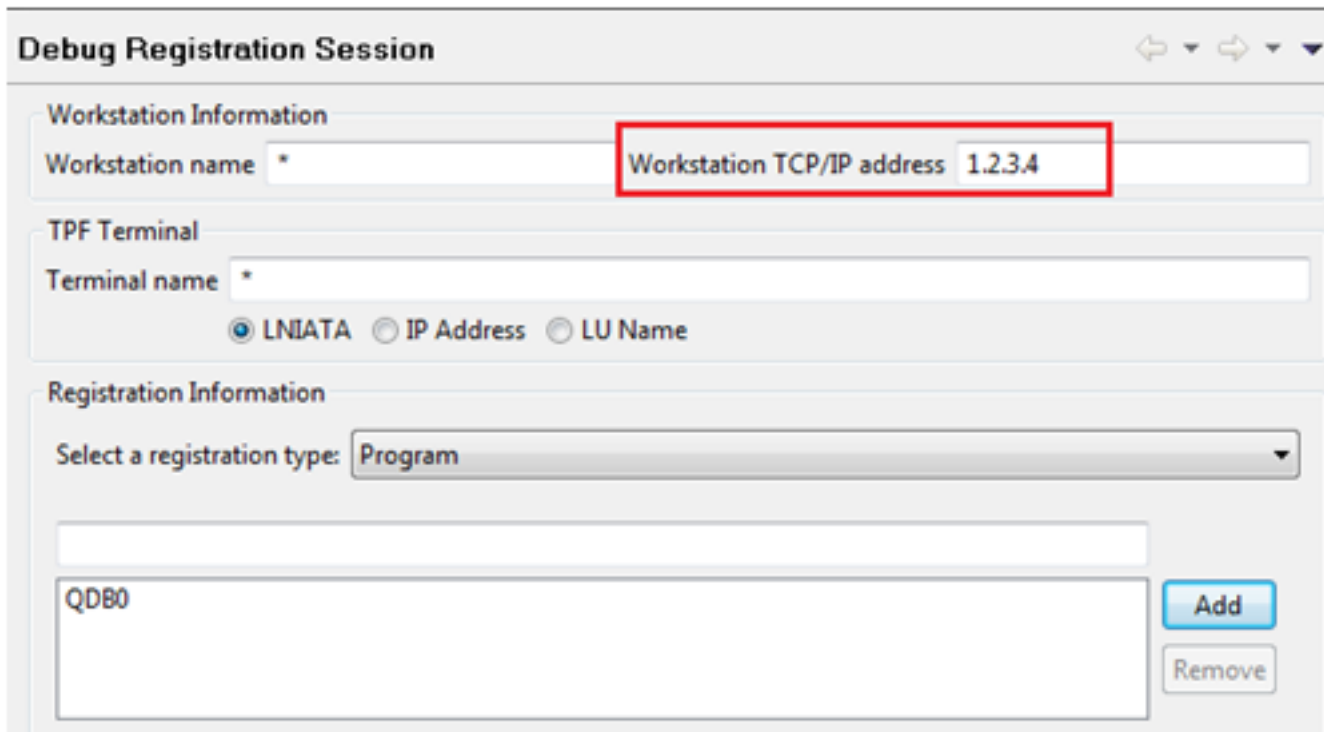
Always ask for IP Address

Auto-detect workstation IP



## Automatic Detection of Workstation IP address

- **If TPF is unable to connect to client on IP address specified by the user, TPF will try and determine the correct address automatically**



**Debug Registration Session**

Workstation Information

Workstation name \*  Workstation TCP/IP address 1.23.4

TPF Terminal

Terminal name \*

LNIATA  IP Address  LU Name

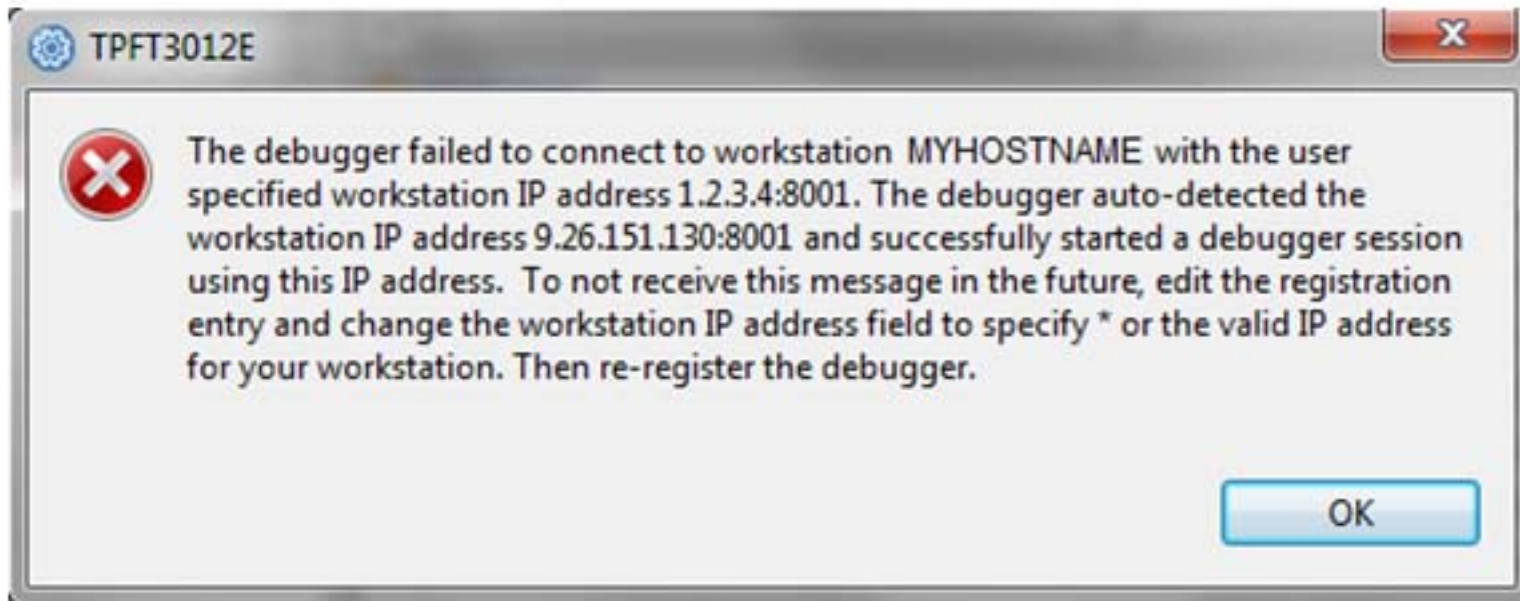
Registration Information

Select a registration type: Program

QDB0

## Automatic Detection of Workstation IP address

- **User is notified if automatic detection of IP was successful**



# Questions

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