z/TPFDF V1.1

TPF Users Group - Spring 2009

z/TPFDF Status Update

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Database Subcommittee

AIM Enterprise Platform Software
IBM z/Transaction Processing Facility Enterprise Edition 1.1.0

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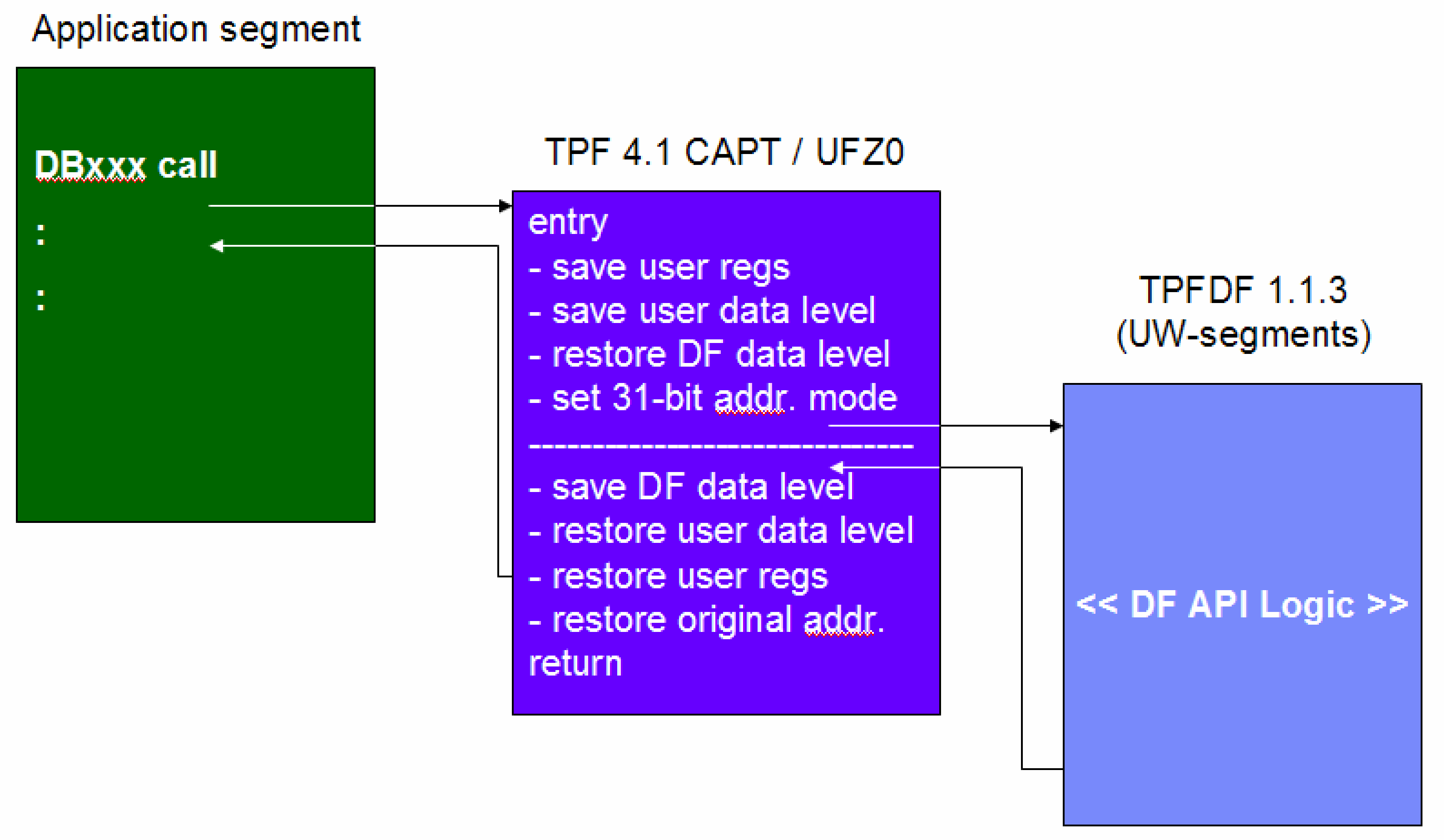
Agenda

- **Improving z/TPFDF performance**
  - TPFDF 1.1.3 linkage vs. z/TPFDF linkage
  - New z/TPFDF linkage
- **z/TPFDF macro breakpoint support for TPF Debugger**
- **TPFUG requirements update**

Linking to the TPFDF central database routines

- **Certain TPFDF macros (DBxxx) and C functions (dfxxx) are processed by the TPFDF central database routines**
- **TPFDF 1.1.3 provided support for a “fast link” mechanism to transfer processing from application code to the central database routines**
- **The fast link mechanism was developed in order to minimize the path length associated with linking to the TPFDF API routines, which can be called very frequently by applications**
- **Some side effects existed due to the use of this unique fast link mechanism:**
  - Special E-type loader considerations
  - No ENTER trace capabilities
  - Limited TPF debugger and performance analyzer capabilities

TPFDF 1.1.3 fast linkage



Application segment

DBxxx call
:
:

TPF 4.1 CAPT / UFZ0

entry
- save user regs
- save user data level
- restore DF data level
- set 31-bit addr. mode

- save DF data level
- restore user data level
- restore user regs
- restore original addr.
return

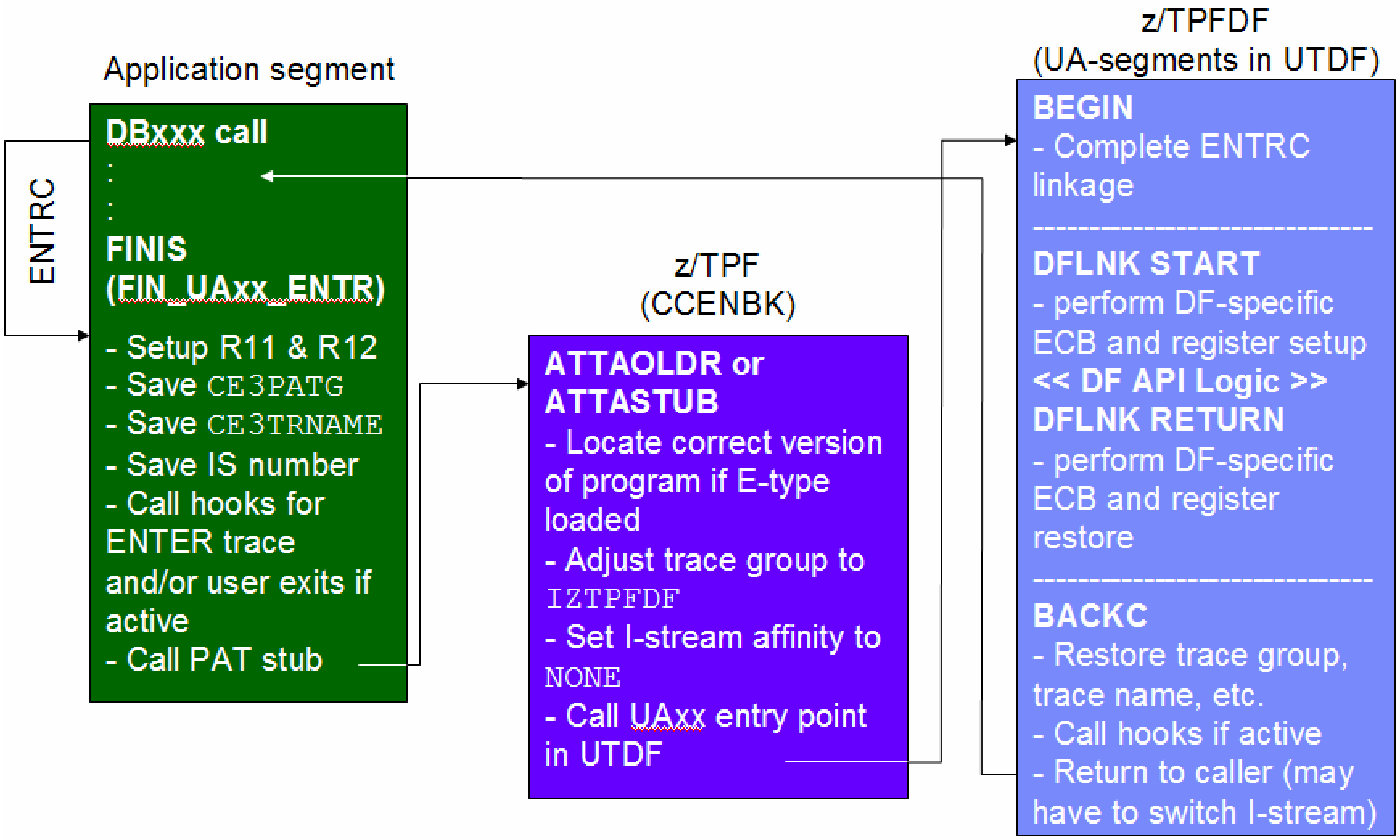
TPFDF 1.1.3
(UW-segments)

<< DF API Logic >>

Changing the linkage model with z/TPFDF

- **z/TPF greatly enhanced the functionality available with the standard Enter/Back linkage and program attributes in the PAT**
  - Diagnostics: Trace groups, enhanced macro trace
  - Runtime: I-stream affinity
- **During z/TPFDF development, the design decision was made to drop the TPFDF-unique fast linkage in favor of using standard Enter/Back linkage**
  - Take advantage of new Enter/Back functionality
  - Allows for seamless integration with the TPF debugger
  - Remove special E-type loader support to help with product maintenance

z/TPFDF standard Enter/Back linkage



Application segment

DBxxx call
:
:
FINIS
(FIN_UAxx_ENTR)

- Setup R11 & R12
- Save `CE3PATG`
- Save `CE3TRNAME`
- Save IS number
- Call hooks for ENTER trace and/or user exits if active
- Call PAT stub

z/TPF
(CCENBK)

ATTAOLDR or ATTASTUB

- Locate correct version of program if E-type loaded
- Adjust trace group to `IZTPFDF`
- Set I-stream affinity to `NONE`
- Call UAxx entry point in UTDF

z/TPFDF
(UA-segments in UTDF)

BEGIN

- Complete ENTRC linkage

DFLNK START

- perform DF-specific ECB and register setup

<< DF API Logic >>

DFLNK RETURN

- perform DF-specific ECB and register restore

BACKC

- Restore trace group, trace name, etc.
- Call hooks if active
- Return to caller (may have to switch I-stream)

Performance implications of new z/TPFDF linkage

- **Measuring the performance impact of switching from TPFDF fast linkage to z/TPF Enter/Back linkage**
  - Path length associated with a single z/TPFDF API call was in line with the expected results from original z/TPFDF design
  - Increased functional enhancements were believed to greatly outweigh the modest path length increases
- **Since z/TPFDF was made generally available in 2005, IBM has invested in the development of a z/TPFDF-specific test driver that more accurately reflects real-life TPFDF application API profiles**
  - Test results indicated the overall application path length was more greatly affected by the new linkage than original estimations predicted
  - TPF Development Lab has begun an effort to modify the z/TPFDF linkage model in order to find a “middle ground” between performance and functionality

Align z/TPFDF performance with TPF 1.1.3 performance

- **Remove low-benefit functionality**
  - No unique `IZTPFDF` trace group, use trace group of application
  - Change IS-affinity to `PROGRAM` from `NONE`
- **Make some functionality optional**
  - New z/TPFDF Enter/Back trace that can be separately enabled/disabled
  - New z/TPFDF function call, function entry, and function return user exits can be separately enabled/disabled
- **Continue to support other functionality**
  - Standard E-type loader support
  - Standard support for z/TPF debugger

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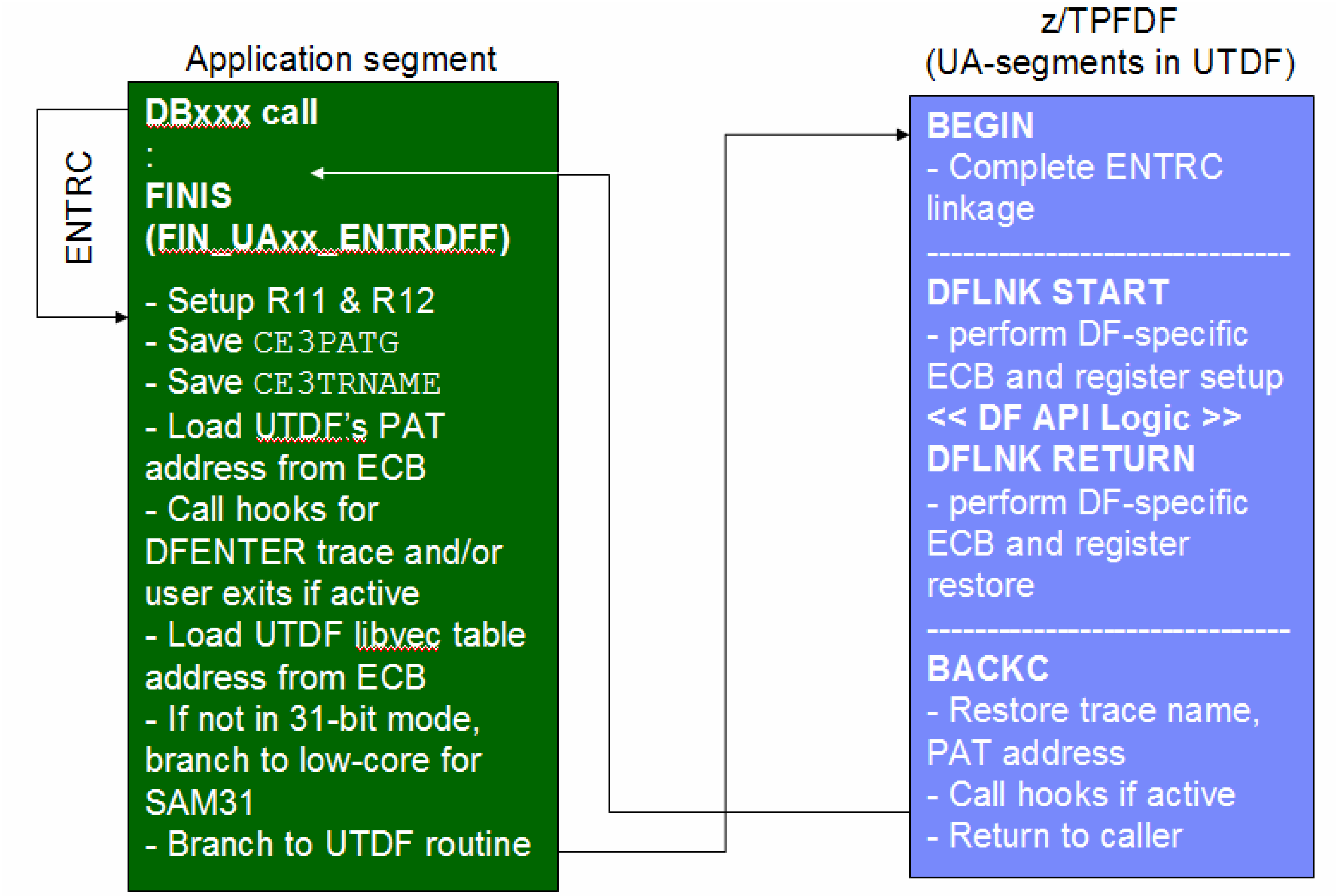
New z/TPFDF fast linkage



Application segment

ENTRC

DBxxx call

:

FINIS

(FIN_UAxx_ENTRDFF)

- Setup R11 & R12
- Save CE3PATG
- Save CE3TRNAME
- Load UTDF's PAT address from ECB
- Call hooks for DFENTER trace and/or user exits if active
- Load UTDF libvec table address from ECB
- If not in 31-bit mode, branch to low-core for SAM31
- Branch to UTDF routine

z/TPFDF

(UA-segments in UTDF)

BEGIN

- Complete ENTRC linkage

DFLNK START

- perform DF-specific ECB and register setup

<< DF API Logic >>

DFLNK RETURN

- perform DF-specific ECB and register restore

BACKC

- Restore trace name, PAT address
- Call hooks if active
- Return to caller

Migrating to the new z/TPFDF linkage

- **Testing of the new support is still in progress**
- **Coexistence and migration considerations:**
  - The “old” z/TPFDF linkage will continue to be supported to ease migration
  - In order to take advantage of the new z/TPFDF linkage, you *must* reassemble *.asm applications that call z/TPFDF macros; *no* recompiles are needed for *.c and *.cpp applications
  - You *must* reassemble *all* callers of CROSC
  - New control program user exits called out of z/TPFDF linkage should be investigated and updated as necessary
- **The new linkage will be provided via 2 co-requisite APARs*:**
  - z/TPF: PJ35509
  - z/TPFDF: PK79078

***** *These APARS are currently scheduled to be available on z/TPF PUT 6 and z/TPFDF PUT 6***

***** *Please check with your customer support representative to determine when these APARs are available***

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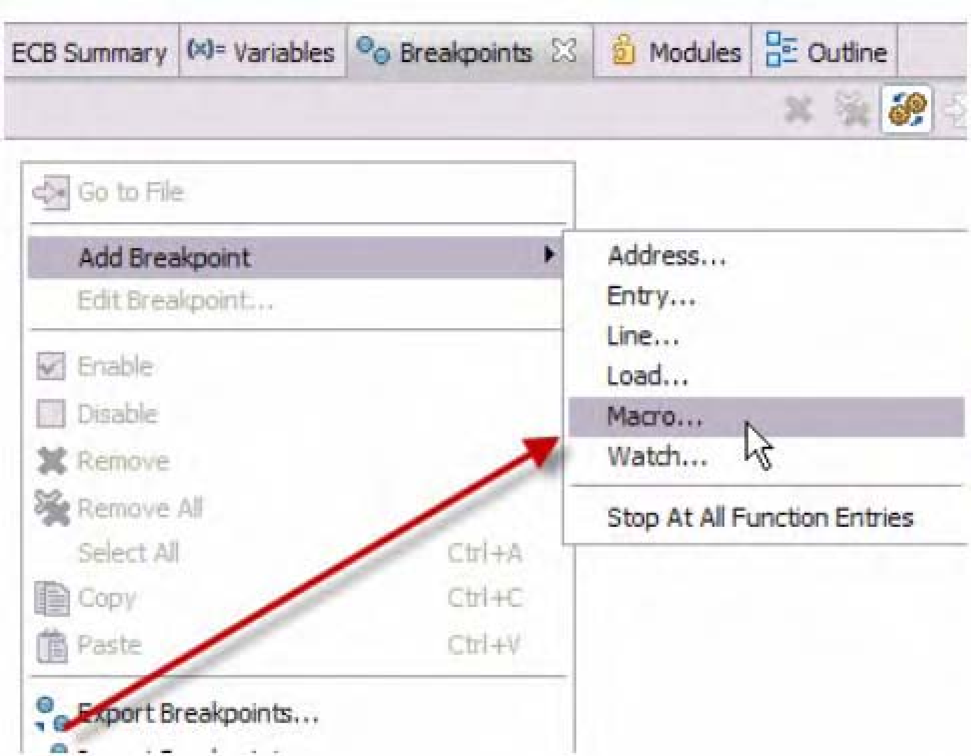
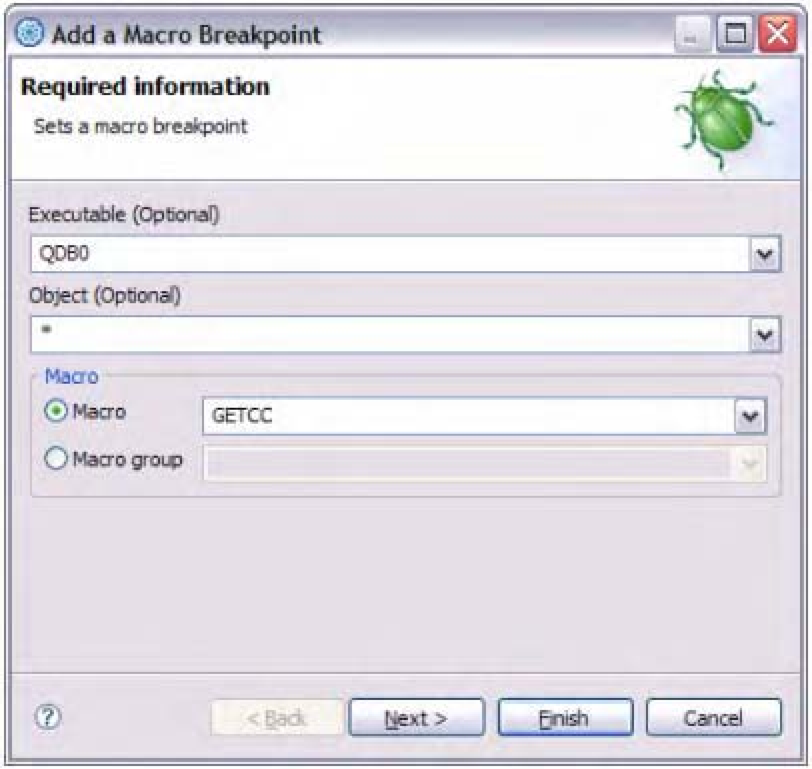
Macro Breakpoint Add

- **Macro Breakpoints now have their own dialog box which is available by right clicking in the breakpoint view (choosing Entry breakpoint and Defer are no longer required)**




Add a Macro Breakpoint

Required information

Sets a macro breakpoint

Executable (Optional): QDB0

Object (Optional): *

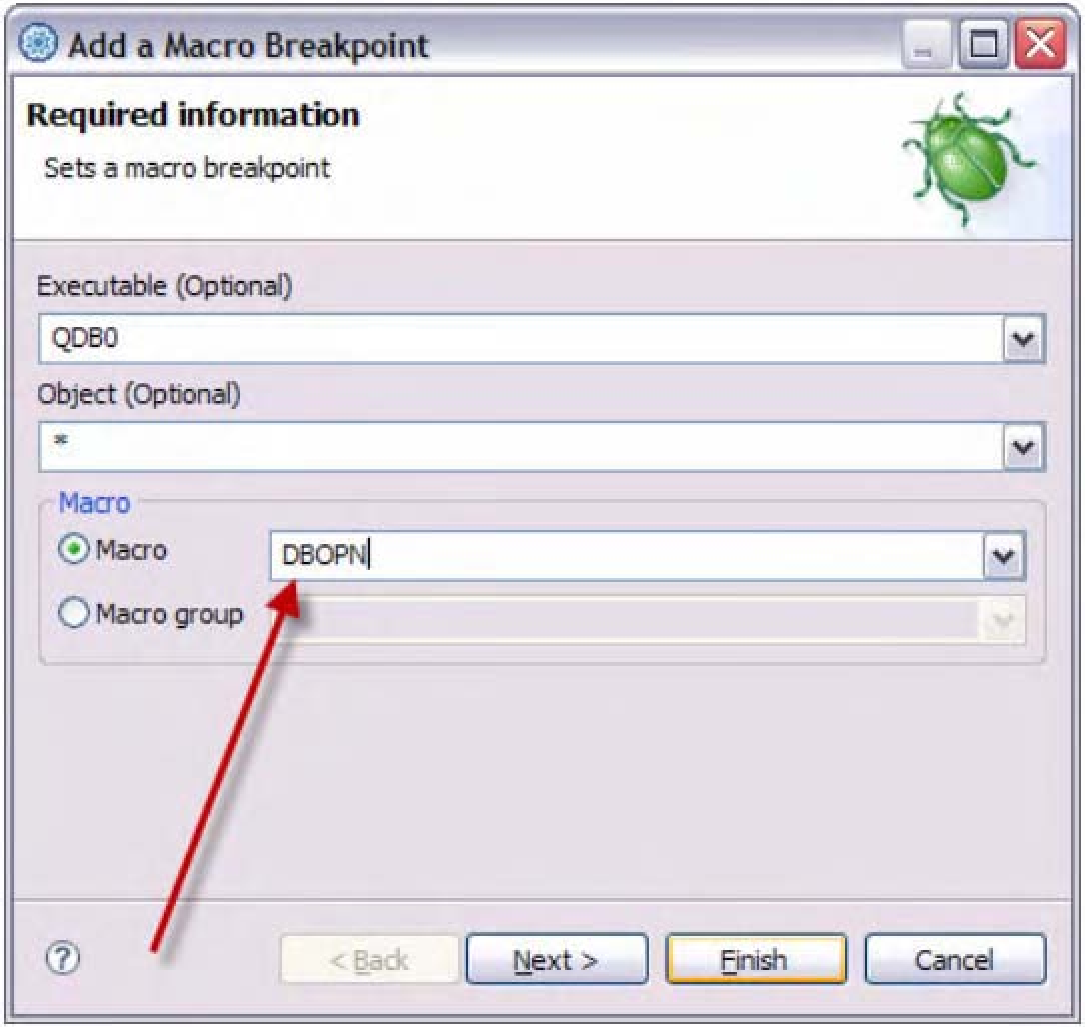
Macro

● Macro: GETCC

○ Macro group

TPFDF Macro Breakpoints

- **z/TPFDF Macro Names can now be entered through the Macro Breakpoint pane (e.g., DBRED, DBOPN, etc)**



Add a Macro Breakpoint

Required information

Sets a macro breakpoint

Executable (Optional): QDB0

Object (Optional): *

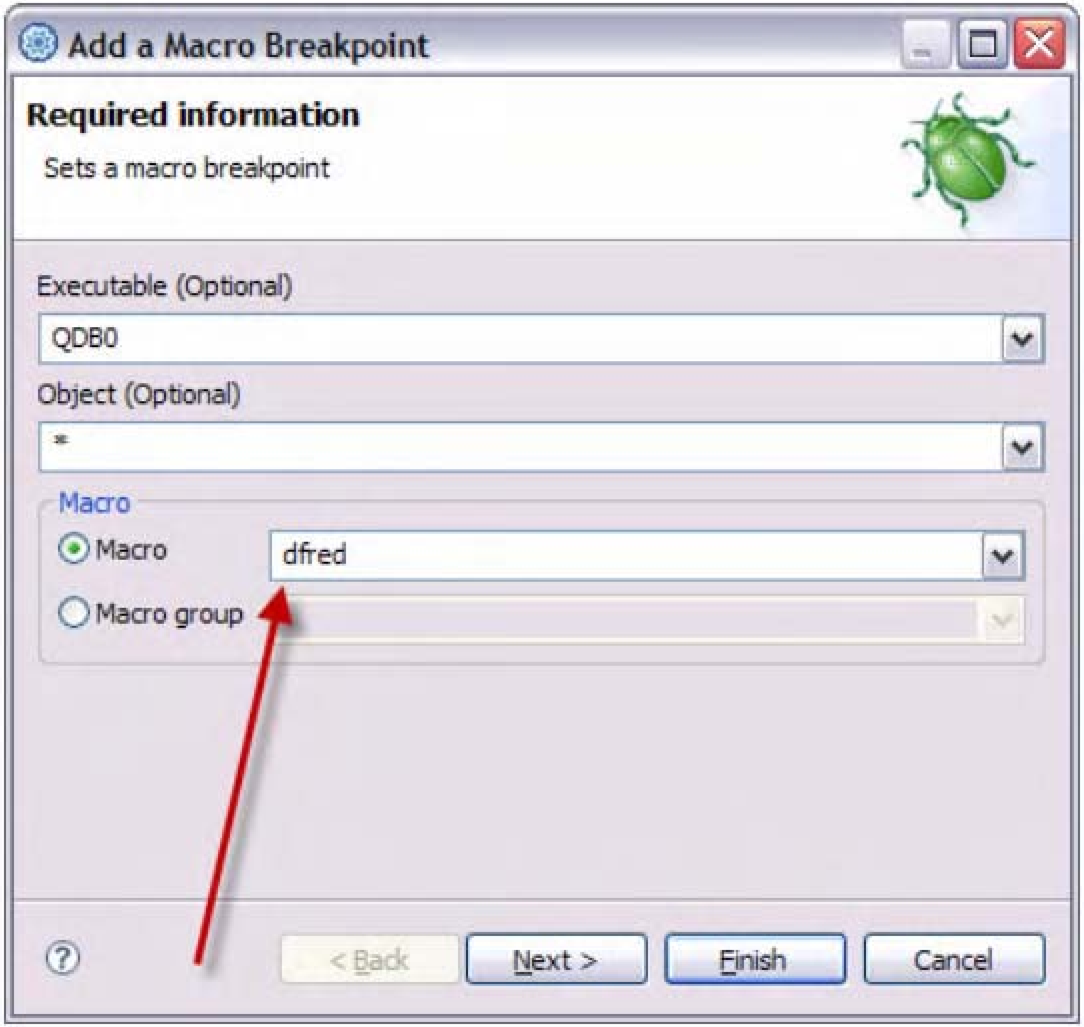
Macro

● Macro: DBOPN

○ Macro group

TPFDF Macro Breakpoints

- **z/TPFDF C/C++ functions can now be entered through the Macro Breakpoint pane (e.g., dfred, dfopn, etc)**



Add a Macro Breakpoint

Required information

Sets a macro breakpoint

Executable (Optional): QDB0

Object (Optional): *

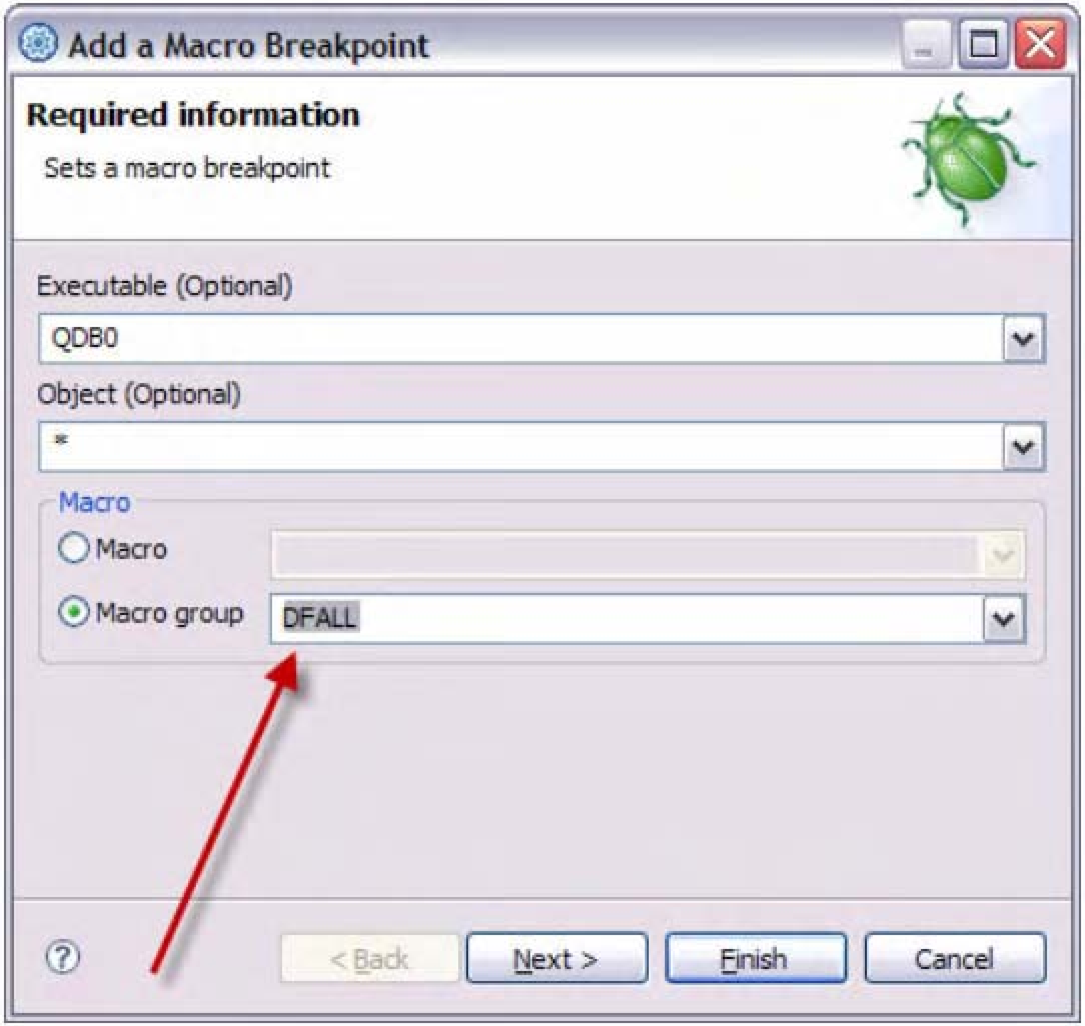
Macro

● Macro: dfred

○ Macro group

DFALL TPFDF Macro Group

- **The DFALL Macro Group will stop the application when any z/TPFDF Macro or C/C++ function is executed by the application**



Add a Macro Breakpoint

Required information

Sets a macro breakpoint

Executable (Optional): QDB0

Object (Optional): *

Macro

○ Macro

● Macro group: DFALL

z/TPF Debugger Deliverable Details

Description	z/TPF APAR	TPF Toolkit Level	TPUG Requirement
Add Macro Breakpoint	PJ35430 PUT6	V3.4.2	V08061S
TPFDF Macro Breakpoints DFALL TPFDF Macro Group	PJ35669 PUT6	None	V08055S

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“Accepted” TPFUG Requirement now “Not Likely”

- **DF00079 – Support memory based z/TPFDF files**
  - DBDEF will specify if a file is memory based
  - DBOPN will allow either:
    - a new instance of the file to be created in memory, or
    - an existing instance of the file to be accessed
  - DBCLS will allow either the instance to be deleted, or simply released allowing other ECBs access

Top 5 TPFDF requirements from Fall 2008 ballot

Rank	Status	Req. Number	Req. Title	Avg. Priority
1	New	DF08191F	Improved TPF/DF Error Checking	13.93
2	Likely	DF08188S	TPFDF CRUISE Provides Additional TARGET Options for Capture	8.57
3	New	DF08190F	TPF/DF to Utilize User Defined Record IDs for GETFCs	8.21
3	Likely	DF00152	TPFDF C API Improvements	8.21
5	Likely	DF08189S	RELFC API for TPFDF	7.14

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