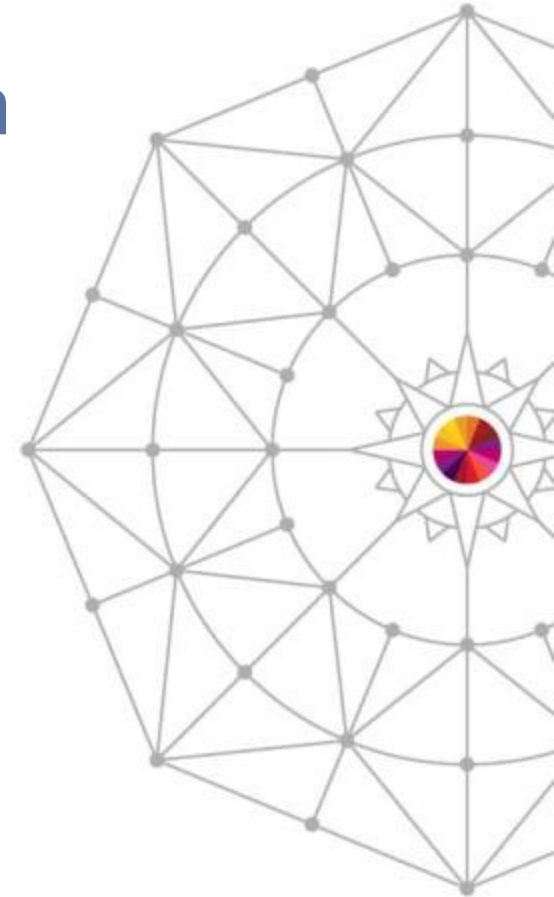


# 2014 TPF Users Group Code Coverage Histogram

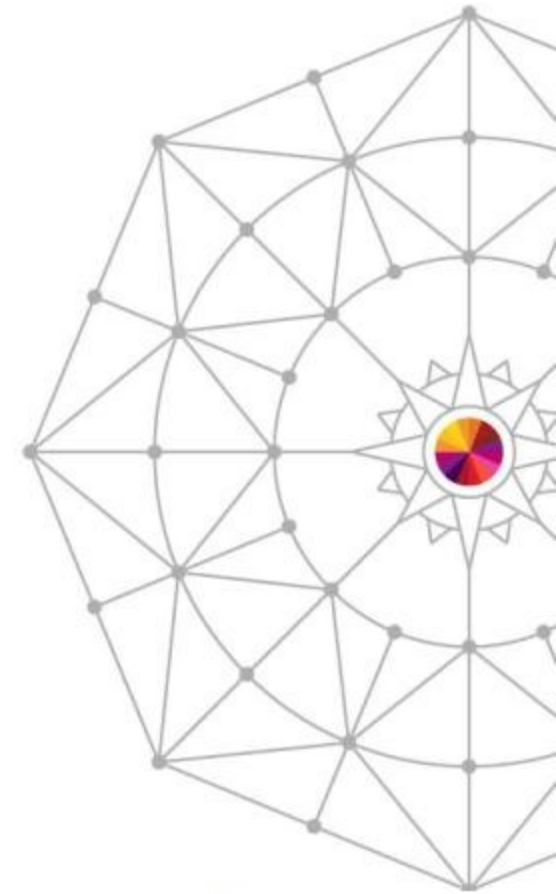
Mohammed Ajmal  
IBM Canada

TPF Toolkit Taskforce  
Tuesday, March 11, 2014



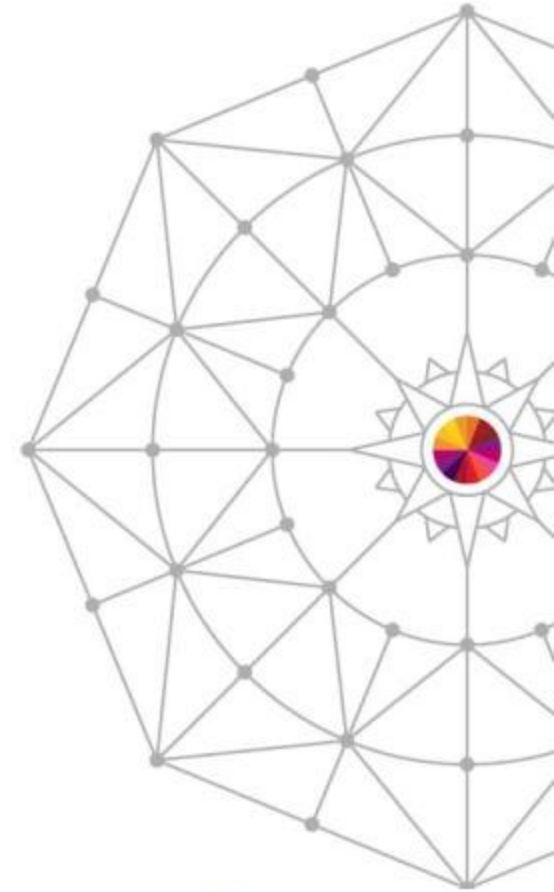
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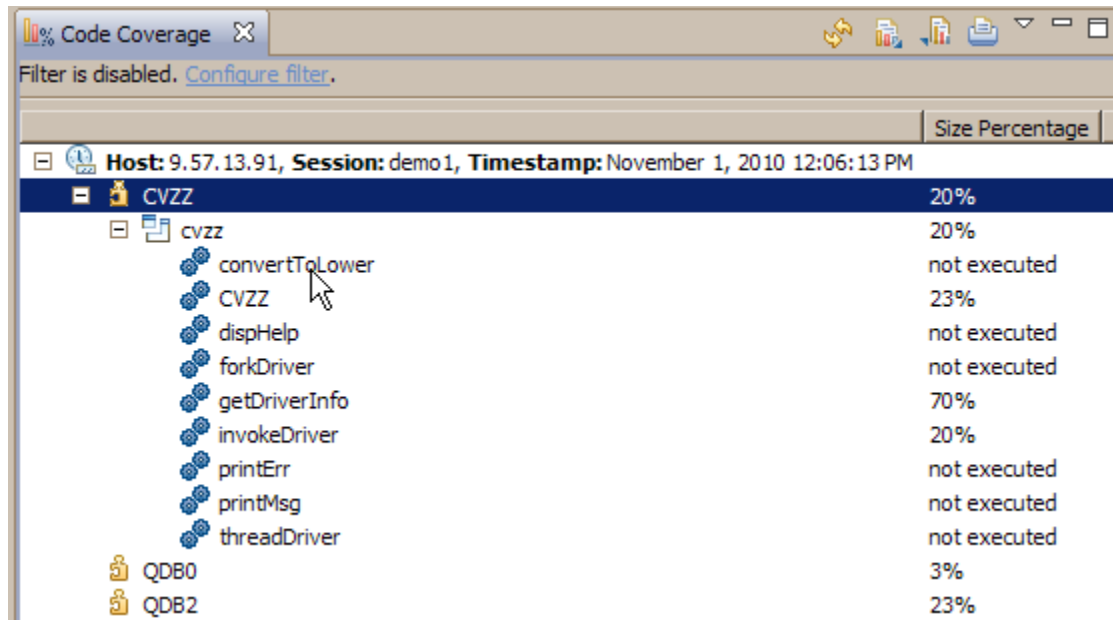
# Agenda

- Code Coverage through the years
  - Code Coverage (initial release)
  - Code Coverage Source Analysis
  - Code Coverage Compare
  - Code Coverage Merge
- Code Coverage Histogram
- Demo
- Questions



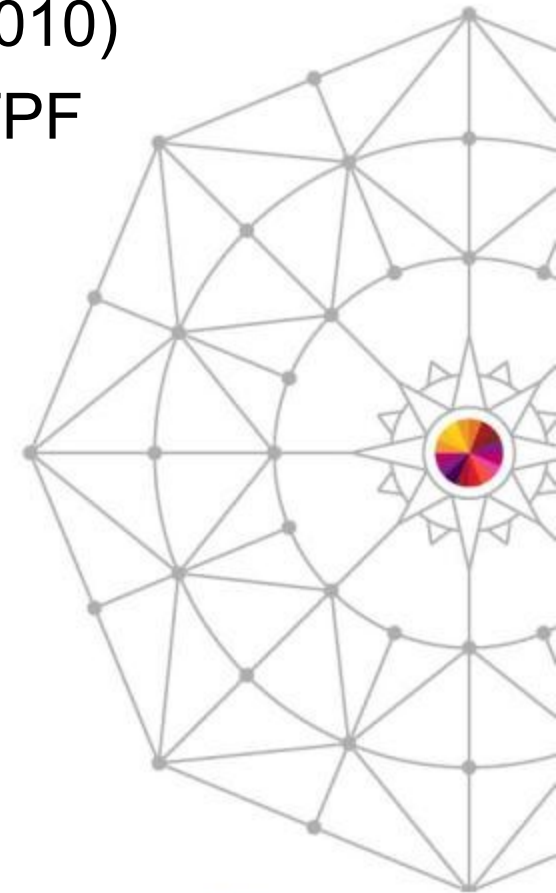
## Code Coverage (initial release)

- Introduced in TPF Toolkit v3.6 (December 2010)
- Allowed users to measure the coverage of TPF applications in response to test transactions
- Coverage is measured at different levels:
  - Module, Object & Function level



Filter is disabled. [Configure filter.](#)

	Size	Percentage
Host: 9.57.13.91, Session: demo1, Timestamp: November 1, 2010 12:06:13 PM		
CVZZ		20%
cvzz		20%
convertToLower		not executed
CVZZ		23%
dispHelp		not executed
forkDriver		not executed
getDriverInfo		70%
invokeDriver		20%
printErr		not executed
printMsg		not executed
threadDriver		not executed
QDB0		3%
QDB2		23%

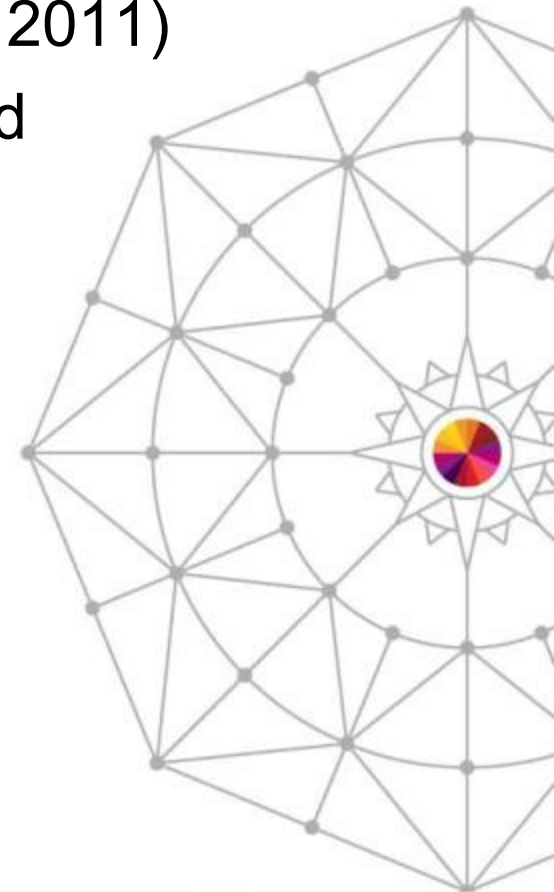


# Code Coverage Source Analysis

- Introduced in TPF Toolkit v3.6.3 (December 2011)
- Allowed users to view executed/not-executed sections of source files directly

Code Coverage window showing filter status: Filter is disabled. [Configure filter.](#)

	Size Percentage	Line Percentage
Host: 9.57.13.91, Session: demo1, Timestamp: October 20, 2011		
CVZZ	20%	debug information must
<b>QDB0</b>	4%	4%
iuddi.hpp [1 function covered. Results may be incomplete.]	can not be determined	not executed
qdb0.cpp	14%	18%
callJava	not executed	not executed
dispHelp	not executed	not executed
<b>myFun()</b>	93%	100%
QDB0	14%	17%
viewDump	not executed	not executed
qdb0bp.cpp	not executed	not executed
qdb0er.cpp	not executed	not executed
qdb0ff.cpp	not executed	not executed
qdb0oo.cpp	not executed	not executed





# Code Coverage Source Analysis

- Graphical display of executed/not-executed sections in existing Remote C/C++ and System Z LPEX editors

The screenshot displays an IDE window titled "Code Coverage" for the file "qdb0.cpp". The left pane shows a tree view of the project structure with a table of coverage data. The right pane shows the source code with color-coded lines indicating execution status.

File	Size Percentage	Line Percentage
Host: 9.57.13.91, Session: de		
CVZZ	20%	debug information m
QDB0	4%	4%
iuddi.hpp [1 function c can not be determined		not executed
qdb0.cpp	14%	18%
callJava	not executed	not executed
dispHelp	not executed	not executed
myFun()	93%	100%
QDB0	14%	17%
viewDump	not executed	not executed
qdb0bp.cpp	not executed	not executed

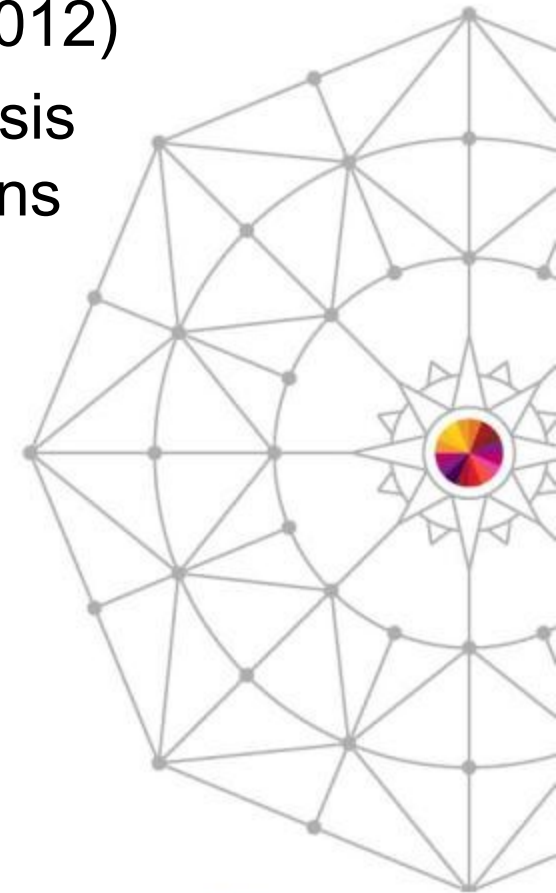
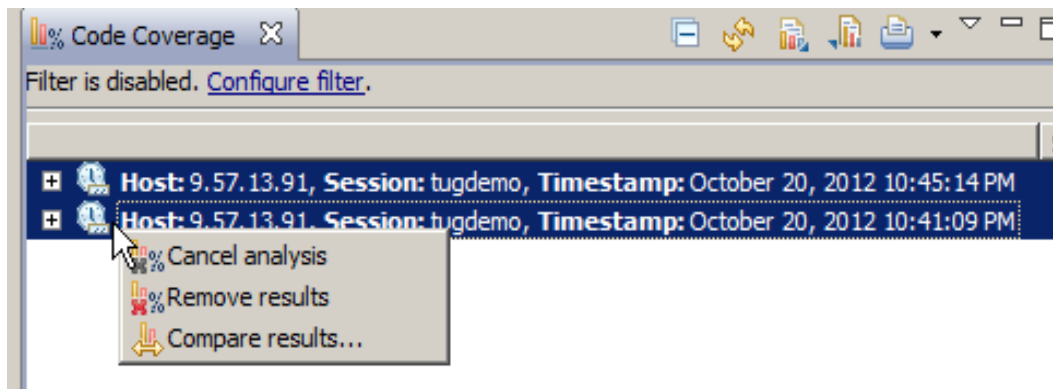
```

136     ecbptr()->ebw001 = type;
137     continue;
138 } /* end of error */
139 else if(strcmp(cur_parm->IPRSE_parameter,"GO-d+
140 {
141     type = QDBGDRV_GO;
142     testcase=atoi(cur_parm->IPRSE_value);
143     ecbptr()->ebw000 = testcase;
144     ecbptr()->ebw001 = type;
145     continue;
146 } /* end of asmexp */
147 if(strcmp(cur_parm->IPRSE_parameter,"EXP-d++")=
148 {
149     tvpe = ODBGDRV_EXP;

```

# Code Coverage Compare

- Introduced in TPF Toolkit v4.0 (December 2012)
- Allowed users to compare size/source analysis data at various levels across multiple sessions



# Code Coverage Compare

tpfxa1.hce Compare Results

Compare code coverage results

	Size 1	Size 2
QDB0	4	5
iuddi.hpp	n/a	n/a
qdb0.cpp	13	13
qdb0bp.cpp	n/a	n/a
qdb0er.cpp	n/a	n/a
qdb0ff.cpp	n/a	n/a
qdb0go.cpp	n/a	n/a
qdb0lk.cpp	39	46
linkCases	39	46
tpfDemo(int)	65	76
qdb0ms.cpp	n/a	n/a
qdb0sk.cpp	n/a	n/a
qdb0sv.cpp	n/a	n/a

	Line 1	Line 2
CVZZ	n/a	n/a
QDB0	4	4
iuddi.hpp	n/a	n/a
qdb0.cpp	15	15
qdb0bp.cpp	n/a	n/a
qdb0er.cpp	n/a	n/a
qdb0ff.cpp	n/a	n/a
qdb0go.cpp	n/a	n/a
qdb0lk.cpp	45	55
linkCases	43	52
tpfDemo(int)	63	88
qdb0ms.cpp	n/a	n/a
qdb0sk.cpp	n/a	n/a

Host: 9.57.13.91, Session: tugdemo, Timestamp: October 20, 2012 10:41:09 PM  
 Host: 9.57.13.91, Session: tugdemo, Timestamp: October 20, 2012 10:45:14 PM

tpfxa1.hce Compare Results

Compare code coverage results

	Size 1	Size 2	Line 1	Line 2
CVZZ	20	0	n/a	n/a
QDB0	4	+1	4	0
iuddi.hpp	n/a	n/a	n/a	n/a
qdb0.cpp	13	0	15	0
callJava	n/a	n/a	n/a	n/a
dispHelp	n/a	n/a	n/a	n/a
QDB0	14	0	16	0
viewDump	n/a	n/a	n/a	n/a
qdb0bp.cpp	n/a	n/a	n/a	n/a
qdb0er.cpp	n/a	n/a	n/a	n/a
qdb0ff.cpp	n/a	n/a	n/a	n/a
qdb0go.cpp	n/a	n/a	n/a	n/a
qdb0lk.cpp	39	+7	45	+10
linkCases	39	+7	43	+9
tpfDemo(int)	65	+11	63	+25
qdb0ms.cpp	n/a	n/a	n/a	n/a
qdb0sk.cpp	n/a	n/a	n/a	n/a
qdb0sy.cpp	n/a	n/a	n/a	n/a
rdh0th.cmn	n/a	n/a	n/a	n/a



# Code Coverage Compare



```
Code Coverage Source Analysis Compare
```

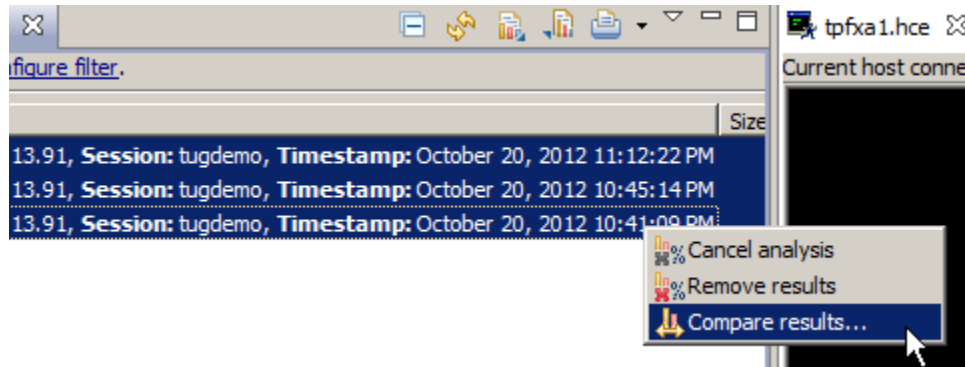
```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <tpf/tpfapi.h>
#include <tpf/tpfregs.h>
#include <qdbgdrv.h>

void tpfDemo(int input) {
    switch (input) {
        case 0:
            QDB0_printf("tpfDemo(), input - %d \n", input);
            break;
        case 1:
            QDB0_printf("tpfDemo(), input - %d \n", input);
            break;
        case 2:
            QDB0_printf("tpfDemo(), input - %d \n", input);
            break;
    }
}
```

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <tpf/tpfapi.h>
#include <tpf/tpfregs.h>
#include <qdbgdrv.h>

void tpfDemo(int input) {
    switch (input) {
        case 0:
            QDB0_printf("tpfDemo(), input - %d \n", input);
            break;
        case 1:
            QDB0_printf("tpfDemo(), input - %d \n", input);
            break;
        case 2:
            QDB0_printf("tpfDemo(), input - %d \n", input);
            break;
    }
}
```

# Code Coverage Compare



tpfxa1.hce Compare Results

### Compare code coverage results

	Size 1	Size 2	Size 3
CVZZ	20	20	20
QDB0	4	5	6
iuddi.hpp	n/a	n/a	n/a
qdb0.cpp	13	13	13
qdb0bp.cpp	n/a	n/a	n/a
qdb0er.cpp	n/a	n/a	n/a
qdb0ff.cpp	n/a	n/a	n/a
qdb0go.cpp	n/a	n/a	n/a
qdb0lk.cpp	39	46	72
linkCases	39	46	71
tpfDemo(int)	65	76	76
qdb0ms.cpp	n/a	n/a	n/a
qdb0sk.cpp	n/a	n/a	n/a

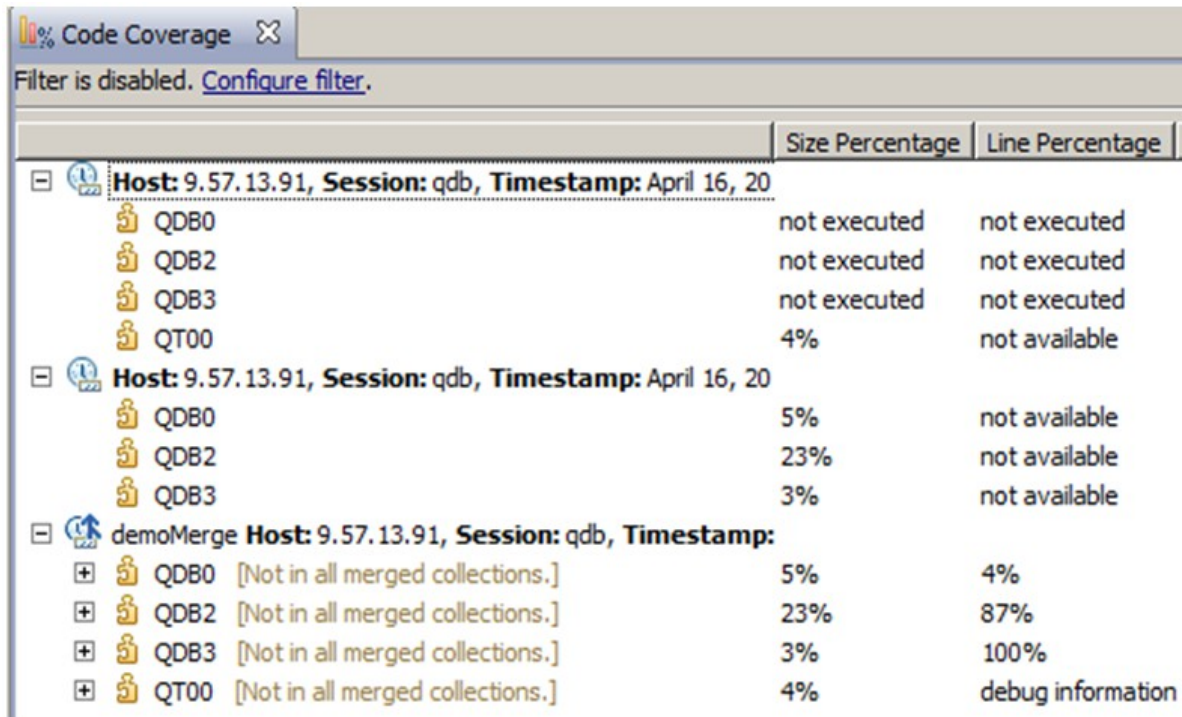
  

	Line 1	Line 2	Line 3
QDB0	4	4	6
iuddi.hpp	n/a	n/a	n/a
qdb0.cpp	15	15	15
qdb0bp.cpp	n/a	n/a	n/a
qdb0er.cpp	n/a	n/a	n/a
qdb0ff.cpp	n/a	n/a	n/a
qdb0go.cpp	n/a	n/a	n/a
qdb0lk.cpp	45	55	84
linkCases	43	52	84
tpfDemo(int)	63	88	88
qdb0ms.cpp	n/a	n/a	n/a
qdb0sk.cpp	n/a	n/a	n/a
qdb0sv.cpp	n/a	n/a	n/a

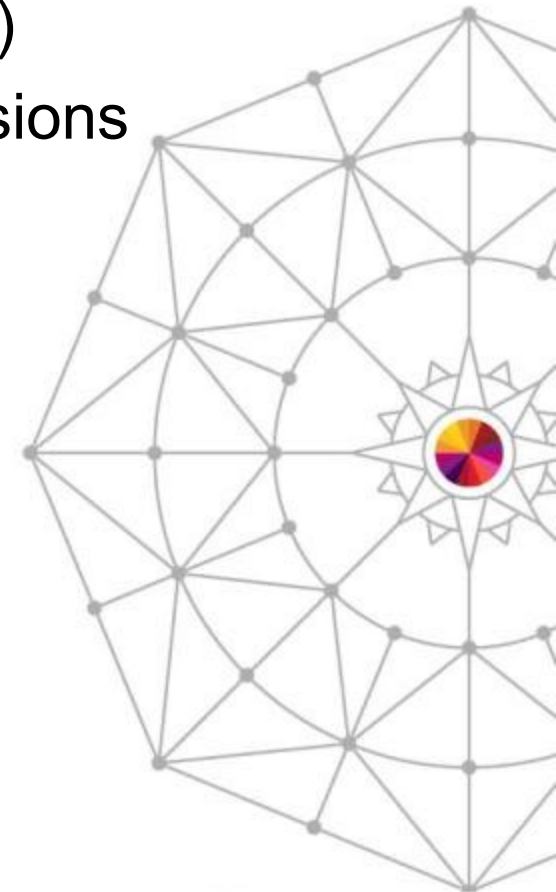
Host: 9.57.13.91, Session: tugdemo, Timestamp: October 20, 2012 10:41:09 PM  
 Host: 9.57.13.91, Session: tugdemo, Timestamp: October 20, 2012 10:45:14 PM  
 Host: 9.57.13.91, Session: tugdemo, Timestamp: October 20, 2012 11:12:22 PM

# Code Coverage Merge

- Introduced in TPF Toolkit v4.0.2 (June 2013)
- Allowed users to merge multiple results sessions to combined (overall) results

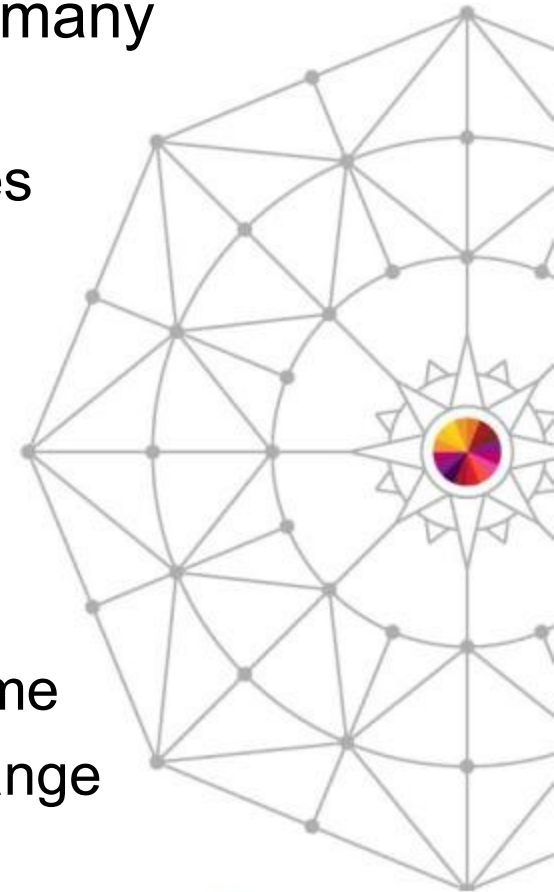


	Size Percentage	Line Percentage
<b>Host: 9.57.13.91, Session: qdb, Timestamp: April 16, 20</b>		
QDB0	not executed	not executed
QDB2	not executed	not executed
QDB3	not executed	not executed
QT00	4%	not available
<b>Host: 9.57.13.91, Session: qdb, Timestamp: April 16, 20</b>		
QDB0	5%	not available
QDB2	23%	not available
QDB3	3%	not available
<b>demoMerge Host: 9.57.13.91, Session: qdb, Timestamp:</b>		
QDB0 [Not in all merged collections.]	5%	4%
QDB2 [Not in all merged collections.]	23%	87%
QDB3 [Not in all merged collections.]	3%	100%
QT00 [Not in all merged collections.]	4%	debug information

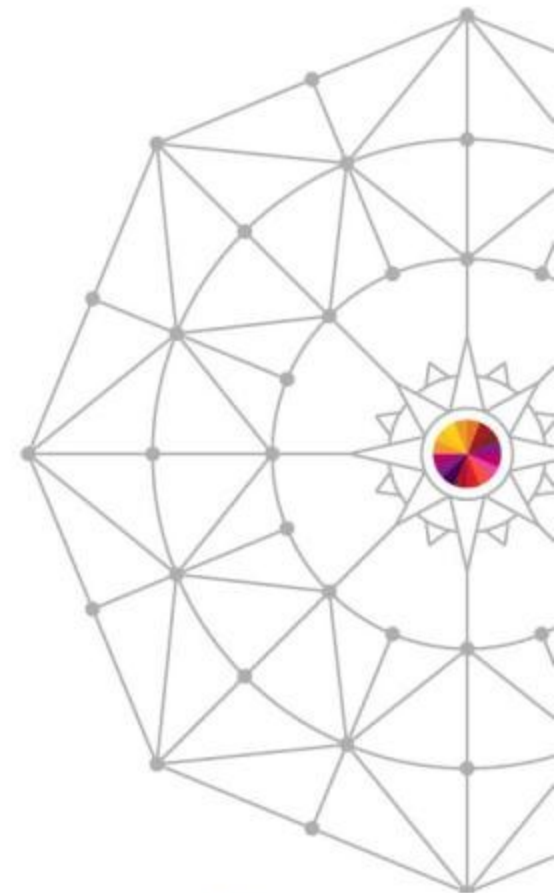


## TPF Toolkit v4.next – Code Coverage Histogram

- Existing TPF Code Coverage view provides many options to more easily consume data
  - Filtering by name or specific percentage ranges
  - Sorting by different criteria
- Wanted a more user-friendly way to digest coverage data for *thousands* of modules
- Histogram provides powerful visualization of results
  - Allows resizing of percentage ranges in real time
  - Allows filtering to see only results in specific range



# Demo





# Questions?



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