

Visual Studio 2015 Diagnostic and Debugging Tools

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About me

- Product Manager at [Cezurity](#)
- One of the core developers of the source code analyzer [PT Application Inspector](#)
- Former Team Lead at Acronis, Luxoft, Boeing

Performance and Diagnostics Hub

- PerfTips
- Memory Usage
- CPU Usage
- Application Timeline

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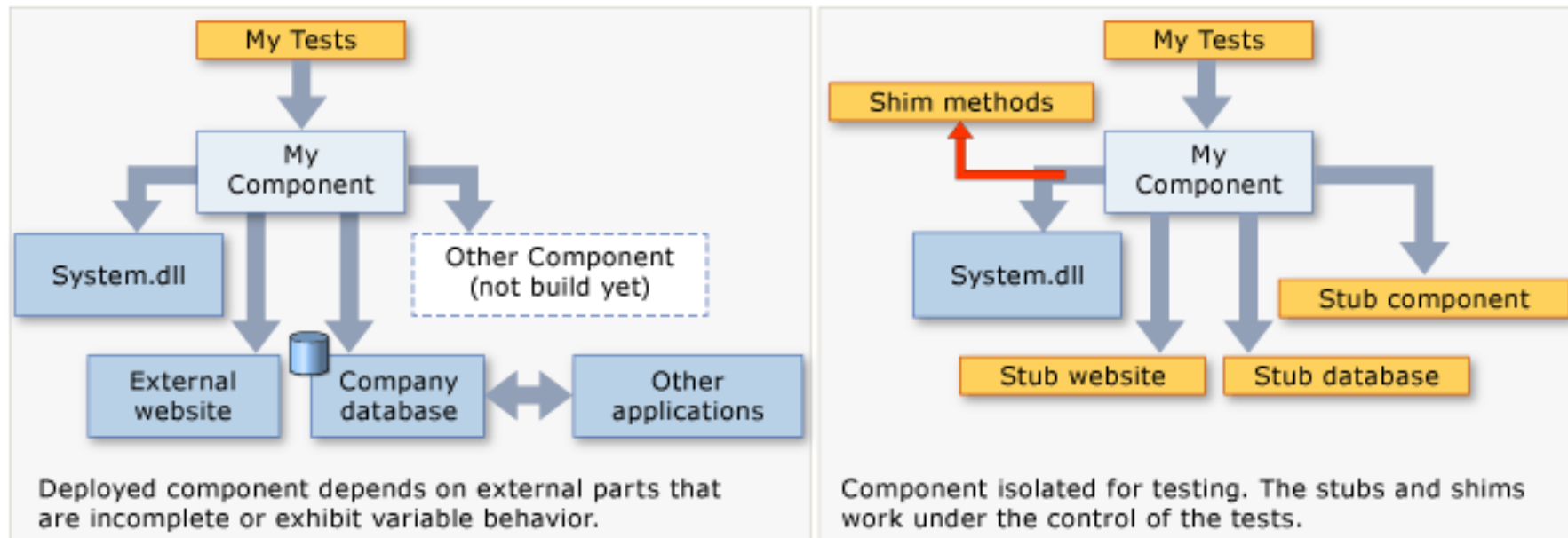
Unit Testing Tools

- Extensible Unit Test framework
- Unit Test Isolation (*Enterprise Edition only*)
- IntelliTest (*Enterprise Edition only*)

Unit Test Isolation

Microsoft Fakes, formerly [Microsoft Research Moles project](#)

Replace parts of the application with *stubs* or *shims*, based on [Microsoft Research ExtendedReflection](#)



IntelliTest

```
}  
0 references  
public static TriangleKind ClassifyBySideLengths(int[] lengths)  
{  
    //validate(lengths);  
}
```

```
int s1 = lengths  
int s2 = lengths  
int s3 = lengths  
  
if (((s1 + s2 <= s3) && (s1 + s3 <= s2) && (s2 + s3 <= s1)) && (s1 > 0 && s2 > 0 && s3 > 0))  
{  
    return TriangleKind.Equilateral;  
}  
else if ((s1 == s2 && s1 != s3) || (s1 == s3 && s1 != s2) || (s2 == s3 && s2 != s1))  
{  
    return TriangleKind.Isosceles;  
}  
else if ((s1 > s2 + s3) || (s2 > s1 + s3) || (s3 > s1 + s2))  
{  
    return TriangleKind.Invalid;  
}  
else if ((s1 == 0 && s2 == 0 && s3 == 0) || (s1 == 0 && s2 == 0 && s3 != 0) || (s1 == 0 && s2 != 0 && s3 == 0) || (s1 != 0 && s2 == 0 && s3 == 0))  
{  
    return TriangleKind.Invalid;  
}  
else if ((s1 == 0 && s2 != 0 && s3 != 0) || (s1 != 0 && s2 == 0 && s3 != 0) || (s1 != 0 && s2 != 0 && s3 == 0))  
{  
    return TriangleKind.Invalid;  
}  
else if ((s1 < 0 || s2 < 0 || s3 < 0))  
{  
    return TriangleKind.Invalid;  
}
```

- Quick Fixes... Ctrl+,
- Rename...
- Organize Usings
- Show on Code Map
- Find All References on Code Map
- Show Related Items on Code Map
- Create Unit Tests
- Create IntelliTest
- Run IntelliTest
- Insert Snippet...

IntelliTest Exploration Results - stopped

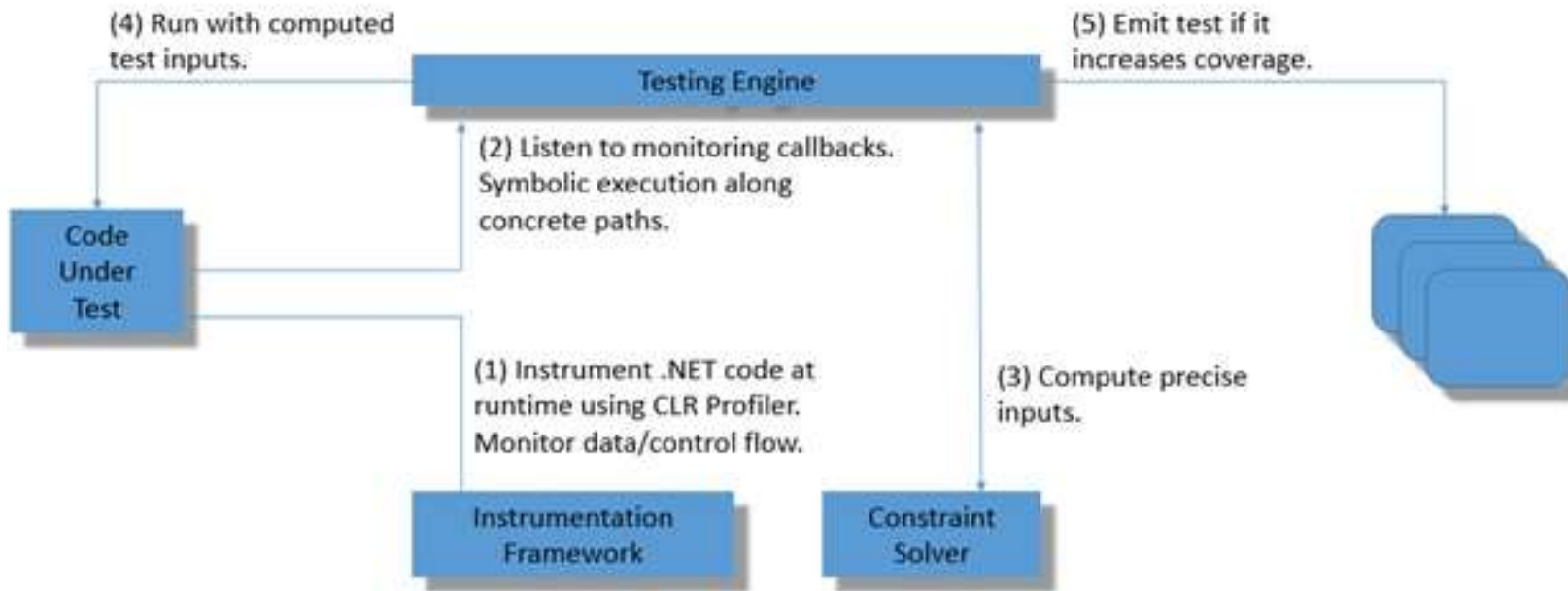
Triangle.ClassifyBySideLengths(int[] lengths) Run

8 4 16/16 blocks, 0/0 asserts, 12 runs

	lengths	result	Summary/Exception	Error Message
1	null		NullPointerException	Object is null
2	{}		IndexOutOfRangeException	Index was outside the bounds of the array.
3	{0}		IndexOutOfRangeException	Index was outside the bounds of the array.
4	{0, 0}		IndexOutOfRangeException	Index was outside the bounds of the array.
5	{0, 0, 0}	Invalid		
6	{5, 538, 0}	Invalid		
7	{67, 0, 0}	Invalid		
8	{422, 536, 67}	Scalene		
9	{528, 413, 528}	Isosceles		
10	{2, 2, 3}	Isosceles		
11	{1, 512, 512}	Isosceles		

IntelliTest

Formerly [Microsoft Code Digger](#) and [Microsoft Research Pex](#) project, based on [Microsoft Research ExtendedReflection](#) and [Z3 solver](#)



How test case generation works

Debugging Tools

- Cross-platform Debugging Support
 - JavaScript / Cordova
 - C# / Xamarin
 - C++ / Android
 - Python
- Lambda Expressions in Watch Window
- New Breakpoint Configuration Experience
- New Exception Window

Lambda Expressions in Watch Window

Watch 1		
Name	Value	Type
▲ items.Where(s => s.StartsWith("3"))	{System.Linq.Enumerable.WhereListIterator<string>}	System.Collections.Generic.
[0]	"368575356"	string
[1]	"364043321"	string
[2]	"332829568"	string
[3]	"330248630"	string
[4]	"337487724"	string
[5]	"357186444"	string
Output Autos Locals Threads Modules Watch 1 Find Symbol Results Breakpoints Exception Settings		

Lambda Expressions in Watch Window

Watch 1

Name	Value	Type
items.Where(s => s.StartsWith("3"))	{System.Linq.Enumerable.WhereListIterator<string>}	System.Collections.Generic.
[0]	"368575356"	string
[1]	"364043321"	string
[2]	"332099568"	string
[3]	"33024865"	string
[4]	"337487724"	string
[5]	"357186444"	string

Output Autos Locals Threads Modules Watch 1 Find Symbol Results Breakpoints Exception Settings

It just works

New Breakpoint Configuration Experience



```
items.Add(generator.Next().ToString());
```

Location: `Repository.cs`, Line: 23, Character: 17, Must match source

☒ Conditions

Hit Count

▼ =

▼ 100 ×

And Filter

▼ Is true

▼ ThreadName == "Worker" ×

[Add condition](#)

☒ Actions

Log a message to Output Window:

☒ Continue execution

Close

New Breakpoint Configuration Experience

The screenshot shows the Visual Studio interface with a breakpoint set on the line `items.Add(generator.Next().ToString());` in `Repository.cs`. The breakpoint configuration window is open, showing the following options:

- Location: `Repository.cs, Line: 23, Character: 17, Must match source`
- ☐ Conditions
- ☒ Actions
 - Log a message to Output Window: `$CALLER Value i = {i}` × Saved
 - ☒ Continue execution
-

Below the configuration window, the Output window is visible, showing the following output:

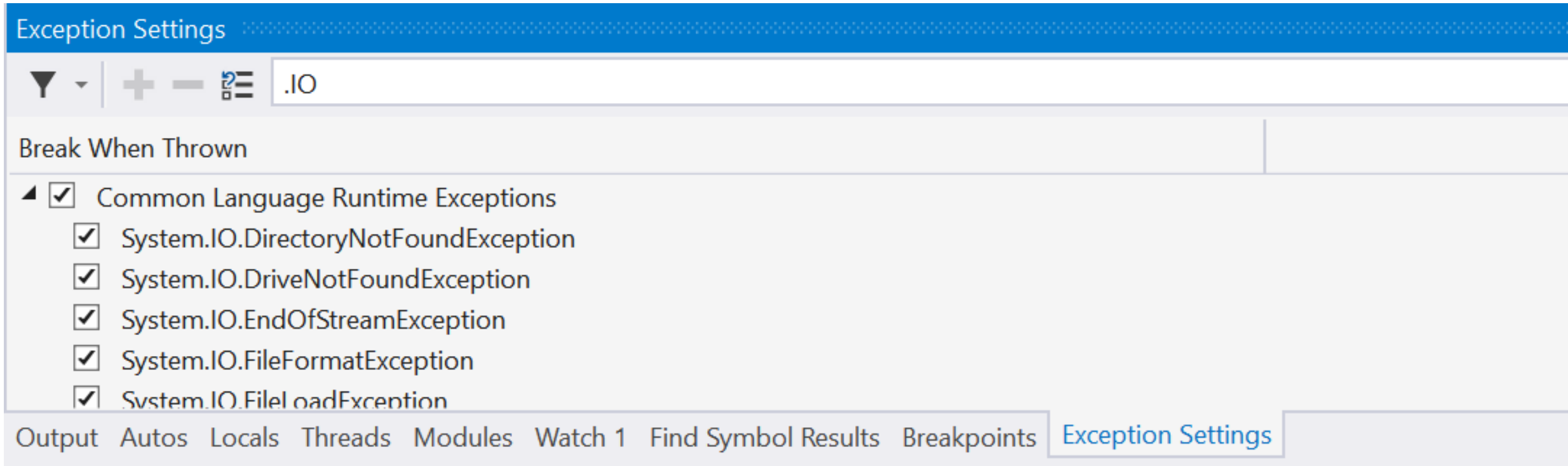
100 %

Output

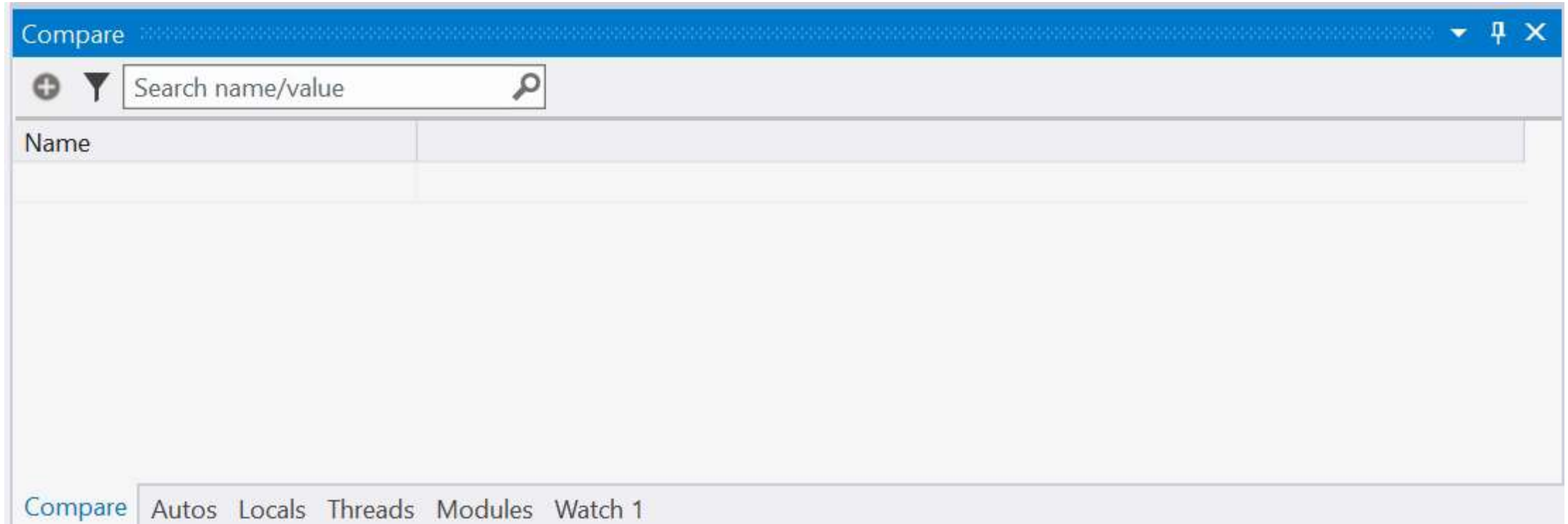
Show output from: `Debug`

DiagnosticToolsSample.MainWindow.button_Click Value i = 974
DiagnosticToolsSample.MainWindow.button_Click Value i = 975
DiagnosticToolsSample.MainWindow.button_Click Value i = 976

New Exception Window



IntelliDebugger extension



Thank you for your attention!

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