

DevOps – Driving Quality Through Risk Mitigation

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Automation Wizard
NGC

GLOBAL PRODUCT DATA
INTEROPERABILITY
S U M M I T
2019



Who is David Votaw?

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- **Background**

- **Software Developer - 14 years**
- **Doctorate of Computer Science (DCS) in Information Assurance**
 - **Dissertation: Improving risk mitigation throughout the software development lifecycle.**
 - **DevOps was my main driver for research**

- **Current Assignments**

- **Taking teams to the next level of DevOps**
- **Research and innovation**

- **Fun**

- **Family**
- **Video games**
- **Road trips**
- **Heavy metal \m/**



Who is David Votaw? Cont.

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Bryce Canyon, Utah - 2019



Zion, Utah - 2019

Who is David Votaw? Cont.

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VM/

[Amon Amarth](#)

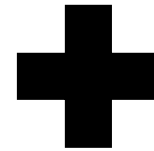
Agenda

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- **This presentation will provide a summary for automation and testing through DevOps:**
 - **Culture and atmosphere to support DevOps**
 - **Test Driven Development (TDD)**
 - **Manual acceptance testing**
 - **Automated regression testing**
 - **Process automation**
 - **Pipeline automation**

Culture and atmosphere to support DevOps

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DevOps

Culture and atmosphere to support DevOps Cont.

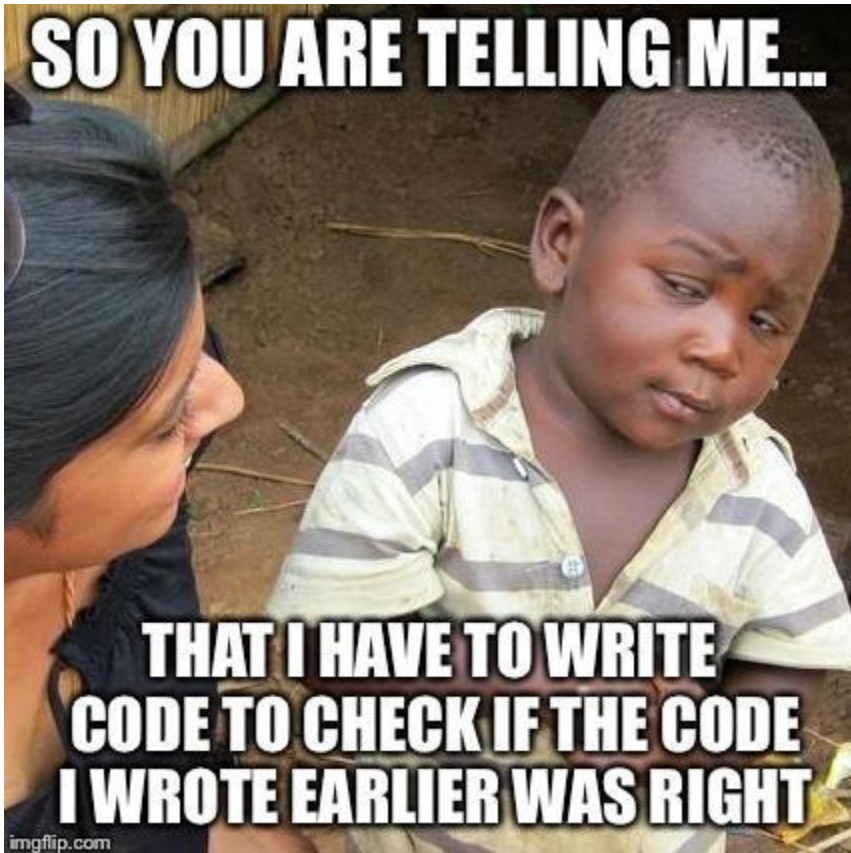
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- **Level setter- if you are not a mature agile team currently, then DevOps is not a good fit for you at this time.**
 - There is no cheat code to get to level 100, you must continue to level up and improve your stats!
 - DevOps is not for Falsely Reporting Agile or “Fragile” teams.
 - “DevOps is hard, and most will fail.” - David Votaw
- **Common understanding and goal from all stakeholders.**
 - If all stakeholders are trained for agile and understand the DevOps journey, then there will be a common understanding of expectations and tone for the solution.
- **Resources: Time, money, and people are necessary.**
 - Dedicated resources, and not one who wears many hats.
 - Teams need to continually learn, innovate, and try new things.



Test Driven Development (TDD)

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Test Driven Development (TDD) Cont.

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- **Yes, lots more code to test a small code block!**
 - Sometimes 10x more code than without a test per method
 - Write a unit test before the actual coded method.

```
[TestClass]
0 references
public class UnitTest1
{
    [TestMethod]
    0 references
    public void TestMethod1_Program_Copies_File()
    {
        //Arrange
        Program p = new Program();
        bool fileExists = false;
        string source = "a";
        string destination = "b";

        //Act
        p.CopyFile(source, destination);
        if (File.Exists(destination))
            fileExists = true;

        //Assert
        Assert.IsTrue(fileExists);

        //Cleanup
    }
}
```

TestMethod1_Program_Copies_File Copy

Source: UnitTest1.cs line 11

✖ TestMethod1_Program_Copies_File

Message: Test method
UnitTestProject1.UnitTest1.TestMethod1_Program_Copies_File threw exception:

```
public class Program
{
    0 references
    public static void Main(string[] args)
    {
        Console.WriteLine("Hello World!");
    }
    1 reference | ✖ 0/1 passing
    public void CopyFile (string source, string destination)
    {
        File.Copy(source, destination);
    }
}
```

- It will fail, and that is ok, now fix it!

Test Driven Development (TDD) Cont.

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- Provide some actual content in the method and test method to copy a file from point a to point b.

```
[TestClass]
0 references
public class UnitTest1
{
    [TestMethod]
    ✓ | 0 references
    public void TestMethod1_Program_Copies_File()
    {
        //Arrange
        Program p = new Program();
        bool fileExists = false;
        string currentDirectory = Environment.CurrentDirectory;
        string source = string.Format("{0}\\file1.txt", currentDirectory);
        string destination = string.Format("{0}\\file2.txt", currentDirectory);
        File.CreateText(source);

        //Act
        p.CopyFile(source, destination);
        if (File.Exists(destination))
            fileExists = true;

        //Assert
        Assert.IsTrue(fileExists);

        //Cleanup
    }
}
```

TestMethod1_Program_Copies_File
Source: UnitTest1.cs line 11
✓ TestMethod1_Program_Copies_File
Elapsed time: 0:00:00.0319308

```
public class Program
{
    0 references
    public static void Main(string[] args)
    {
        Console.WriteLine("Hello World!");
    }
    1 reference | ✗ 0/1 passing
    public void CopyFile (string source, string destination)
    {
        File.Copy(source, destination);
    }
}
```

- Hey look at that, it passes!
- But what happens if we run the same test again??

TestMethod1_Program_Copies_File Copy
Source: UnitTest1.cs line 11
✗ TestMethod1_Program_Copies_File
Message: Test method
UnitTestProject1.UnitTest1.TestMethod1
Program_Copies_File threw exception:
System.IO.IOException: The file 'C:\Users

Test Driven Development (TDD) Cont.

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- **Why did it fail? The first run was successful, but all subsequent runs fail, why is that?**

```
[TestClass]
0 references
public class UnitTest1
{
    [TestMethod]
    0 references
    public void TestMethod1_Program_Copies_File()
    {
        //Arrange
        Program p = new Program();
        bool fileExists = false;
        string currentDirectory = Environment.CurrentDirectory;
        string source = string.Format("{0}\\file1.txt", currentDirectory);
        string destination = string.Format("{0}\\file2.txt", currentDirectory);
        File.CreateText(source);

        //Act
        p.CopyFile(source, destination);
        if (File.Exists(destination))
            fileExists = true;
        //Assert
        Assert.IsTrue(fileExists);

        //Cleanup
    }
}
```

TestMethod1_Program_Copies_File Copy

Source: UnitTest1.cs line 11

✖ TestMethod1_Program_Copies_File

Message: Test method
UnitTestProject1.UnitTest1.TestMethod1_Program_Copies_File threw exception:
System.IO.IOException: The file 'C:\Users

```
public class Program
{
    0 references
    public static void Main(string[] args)
    {
        Console.WriteLine("Hello World!");
    }
    1 reference | 0/1 passing
    public void CopyFile (string source, string destination)
    {
        File.Copy(source, destination);
    }
}
```

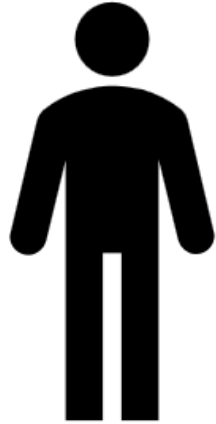
Things to think about:

- What if file1 doesn't exist?
- What if file2 does exist?
- What if neither exist?
- What if access is denied?
- What if there is a network error?
- What if "insert statement here", etc...

Manual acceptance testing

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Manual Testing



VS

Automated Testing



Manual acceptance testing Cont.

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- Somebody has to do the work manually to clearly define the manual process for testing.
- You cannot automate manual testing of a immature or non-repeatable process, but rather, it takes time and effort to make a mature and repeatable process.



The manual test cases must be well-defined and understood before any automation can occur.

Automated regression testing

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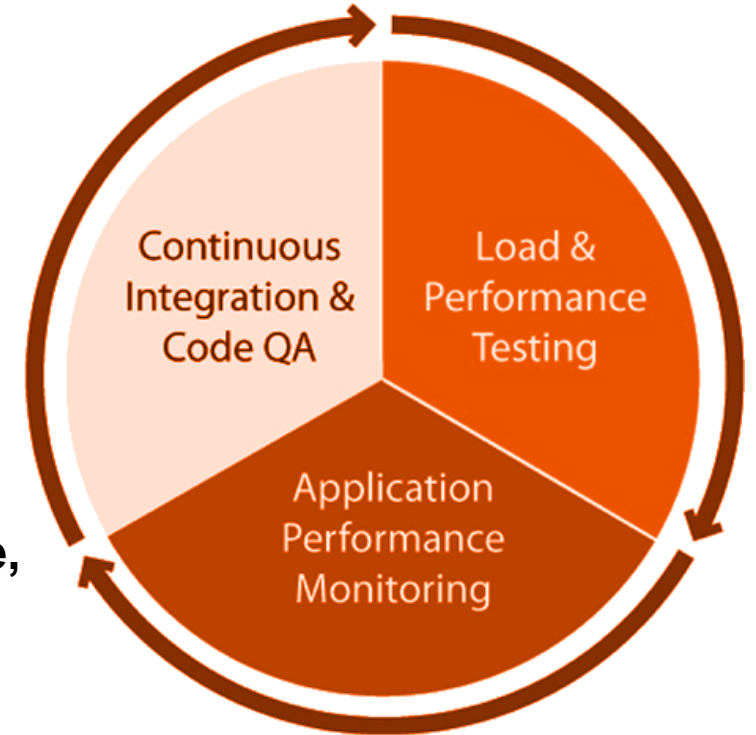
Automated regression testing Cont.

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You want the same level of rigor and repeatability through regression testing, just as you do with unit level testing.

These majority of tests are not a one and done, but rather these tests will be tweaked and maintained each iteration!



Process automation

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Process automation Cont.

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Process automation traditionally starts with a Continuous Integration (CI) build



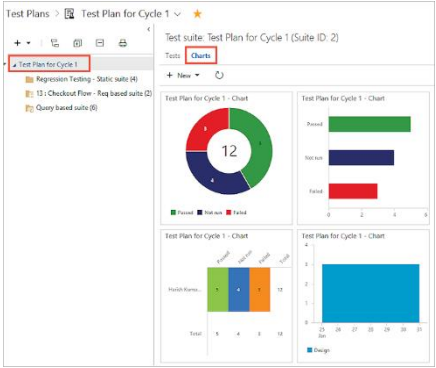
- Code change
- Check-in
- Unit testing
- Static Code Analysis (SCA)
- Compiled output



- Copy artifacts
- Run scripts
- Configuration
- Deployments



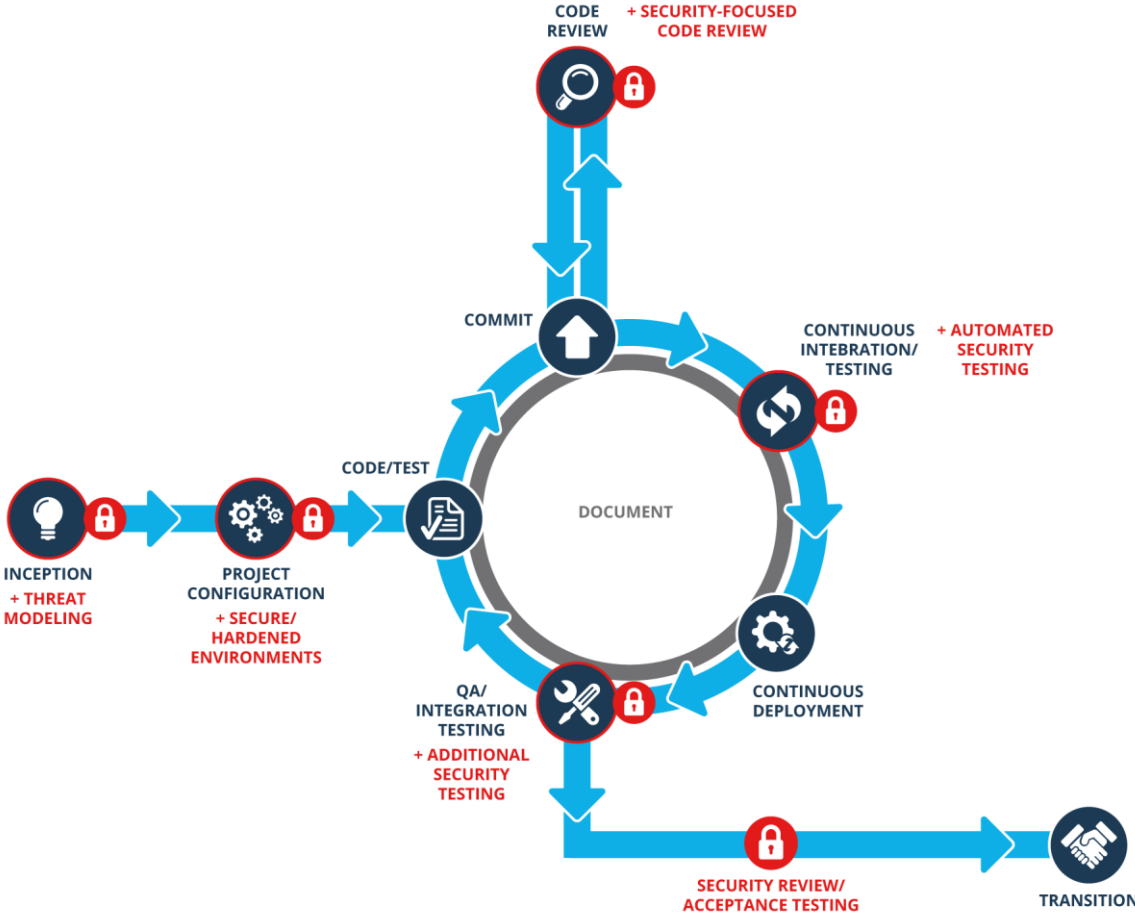
- Acceptance testing
- User testing
- Integration testing
- Bug reports



These three related but separate processes can become one with pipeline automation

Pipeline automation

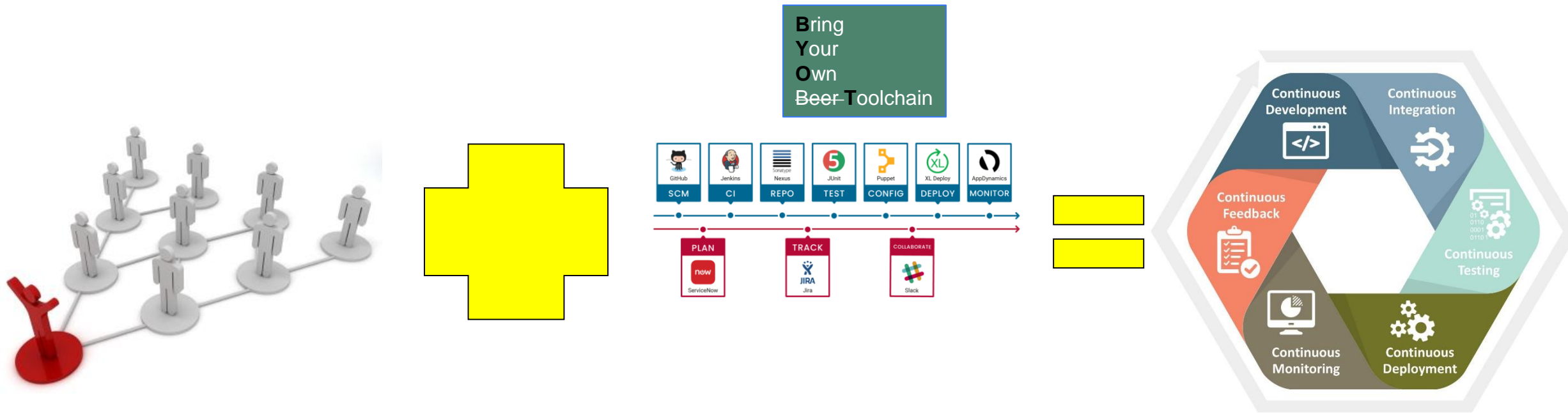
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Pipeline automation Cont.

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- Every vendor is going to try and sell you a solution that tries to do it all
- Are you **Developer** or **Operations** heavy?
- Tools are tailored for both sides of the equation, and depending where you fall on that scale should warrant tool research.



Questions??

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Reference Images

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