

Intro to Automated DB Deployments with GitHub



SQL Saturday Atlanta 2024

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Please give a big thank you to
 our sponsors & stop by their tables!



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Erin Dempster



- She/Her

Data Operations Team Lead

Trean Corporation

- SQL Server DBA
- Azure Administrator
- Azure DevOps Administrator

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Speaker – PASS Summit, SQLBits +

Author – SQLServerCentral.com



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Link to Today's Content

<https://github.com/endlessautomation/SQLSat>



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Who's in the Audience?

- Application Developers?
- Database Developers?
- Database Administrators?
- IT Managers?



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Who am I Expecting Today?

- Everyone, of course, especially
- Application Developers working with Databases
- Database Developers
- Have **some familiarity** with source control

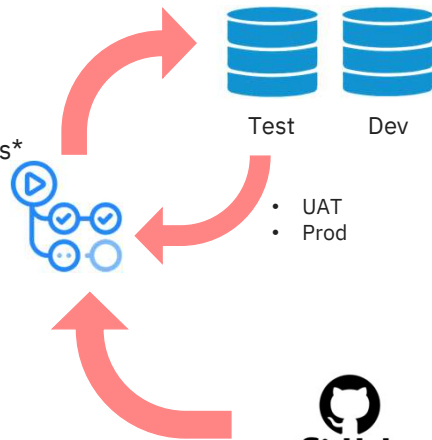


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Agenda

GitHub Actions

1. Build
2. Automated Tests*
3. Approve
4. Deploy
5. Repeat 3&4



Visual Studio


- Reverse Engineer
- Develop
- Unit Test
- Commit Changes

Git Client

GitHub
Code
Repositories

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Introduction to Visual Studio

SQL Database Project

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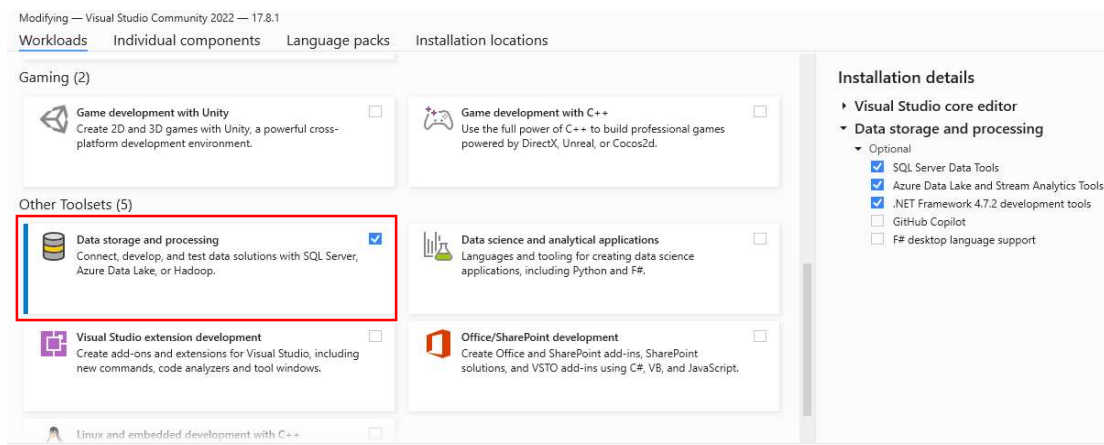
Visual Studio – SQL Database Project

- Long-Time Support for SQL Databases
- Build Projects with msbuild.exe
- Creates a .DACPAC for Deployment



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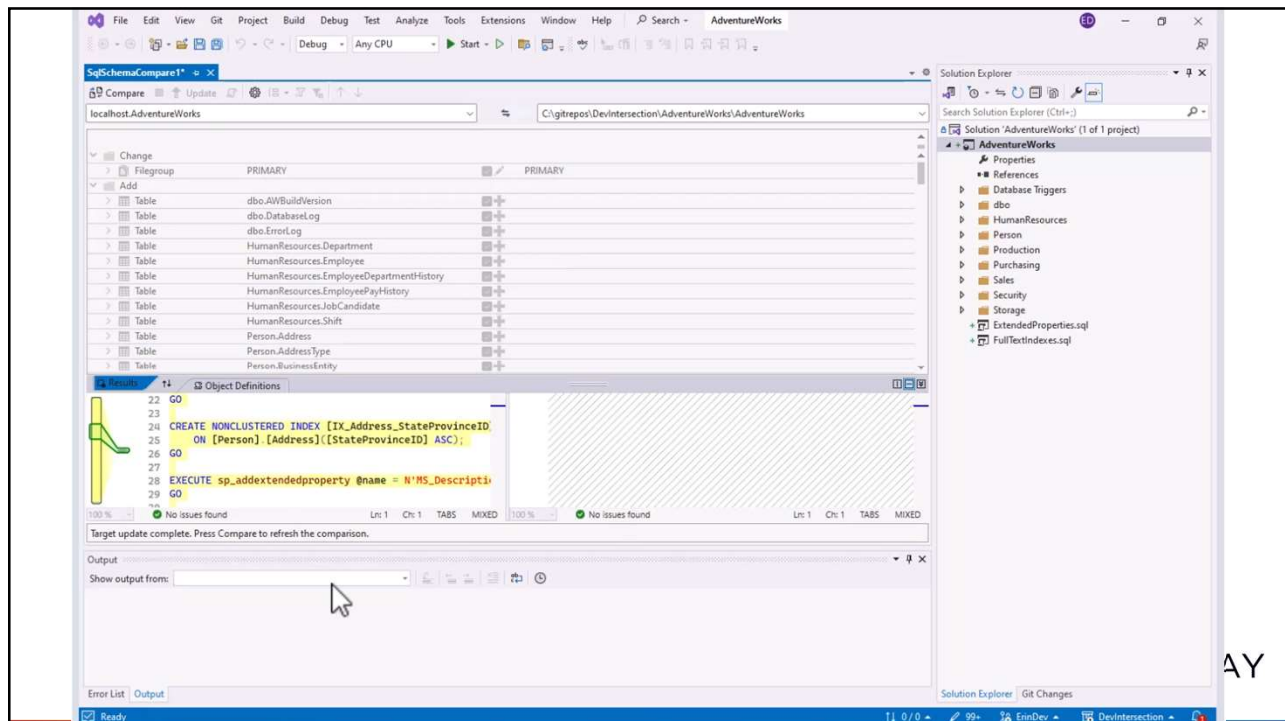
Visual Studio Installer



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Introduction to GitHub

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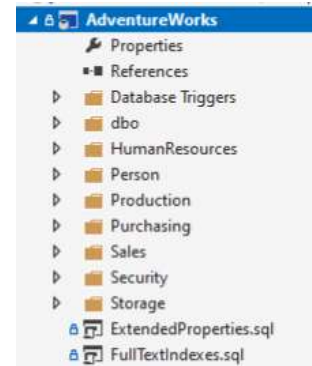
GitHub

- Public-focused Source Control Solution
- Code-focused
 - Tasks limited to Issue Logs
 - Often integration with Jira for task boards
- Acquired by Microsoft in 2019

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GitHub Actions

- Manages code builds and deployments
- Triggered from many events
 - Code check-ins (push)
 - Pull Requests (pull_request)
- Define **YOUR** workflow with YAML!



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What is YAML?



“YAML Ain’t Markup
Language



Configuration Layout



Used by both GitHub Actions
and Azure Pipelines



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YAML - GitHub Actions vs Azure Pipelines

```

name: Build AdventureWorks

on:
  push:
    branches: [main]
  workflow_dispatch:

jobs:
  build:
    runs-on: windows-latest
    steps:
      - uses: actions/checkout@v3

      - name: Add MSBuild to PATH
        uses: microsoft/setup-msbuild@v1.0.2

      - name: Build
        working-directory: ${env.GITHUB_WORKSPACE}
        run: msbuild /m /p:Configuration=Release Adventureworks/Adventureworks.sqlproj
  
```

```

trigger:
- main

pool:
- vmImage: windows-latest

jobs:
- job: buildDACPAC
  displayName: Build Azure Data Studio DACPAC
  steps:
  - task: DotNetCoreCLI@2
    inputs:
      command: 'build'
      projects: '**/Adventureworks.sqlproj'
  
```



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GitHub Workflow - Triggers

```

3   on:
4     pull_request:
5       branches: [ "test" ]
6
7     workflow_dispatch:
  
```

Quick Example #1

- 2 Triggers
- Pull request going to 'test' branch
 - Workflow runs when Pull Request is opened
- Manual trigger, workflow_dispatch

```

3   on:
4     pull_request:
5       types: [ "closed" ]
6       branches: [ "dev" ]
7
8     workflow_dispatch:
  
```

Quick Example #2

- 2 Triggers
- Pull request going to 'dev'
 - Workflow runs when PR is closed
- Manual trigger, workflow_dispatch



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GitHub Workflow - Triggers

```
3   on:
4     push:
5       branches: [ "dev" ]
```

Quick Example #3

- 1 Trigger - Push code to 'dev' branch



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Jobs

- Run Sequentially or in Parallel
- Inherit settings from the Workflow
- Override Workflow settings
 - Ex: runs-on

```
jobs:
  build:
    runs-on: self-hosted
    steps:
      - uses: actions/checkout@v3
      - name: Add msbuild to PATH
        uses: microsoft/setup-msbuild@v1.1
      - name: Build AdventureWorks DACPAC
        run: msbuild AdventureWorks\AdventureWorks.sqlproj
      - uses: actions/upload-artifact@v3
        with:
          name: AdventureWorks
          path: AdventureWork/bin/debug/AdventureWorks.dacpac
  deployToTest:
    name: Deploy DACPACs to Test
    needs: build
    runs-on: self-hosted
    environment: Test
    steps:
      - uses: actions/download-artifact@v3
        with:
          name: AdventureWorks
          path: ./AdventureWorks
      - name: Deploy DACPAC
        run: sqlpackage.exe /SourceFile:".\AdventureWorks\AdventureWorks.dacpac"
        /action:publish
        /TargetConnectionString:"Server=localhost;Database=AWTest;Integrated Security=SSPI;Encrypt=false"
```



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```

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```

2 Jobs

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```

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Job Steps

```
steps:
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  - name: Add msbuild to PATH
    uses: microsoft/setup-msbuild@v1.1
  - name: Build AdventureWorks DACPAC
    run: msbuild AdventureWorks\AdventureWorks.sqlproj
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    with:
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```



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```

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Runners

```
build:
  runs-on: self-hosted
```

- Workflow Execution Agent
 - GitHub-hosted
 - Windows
 - Ubuntu
 - Self-hosted
 - Windows
 - Linux
 - Mac
- ← Much, much faster



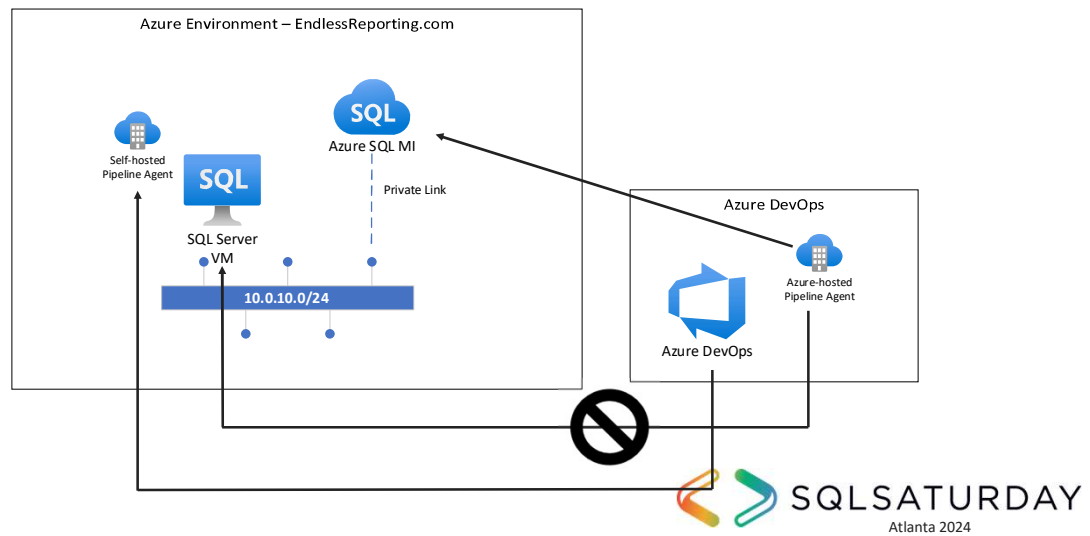
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Network Communications

GitHub Action Workflows and Azure SQL DB/MI vs SQL Server Instances

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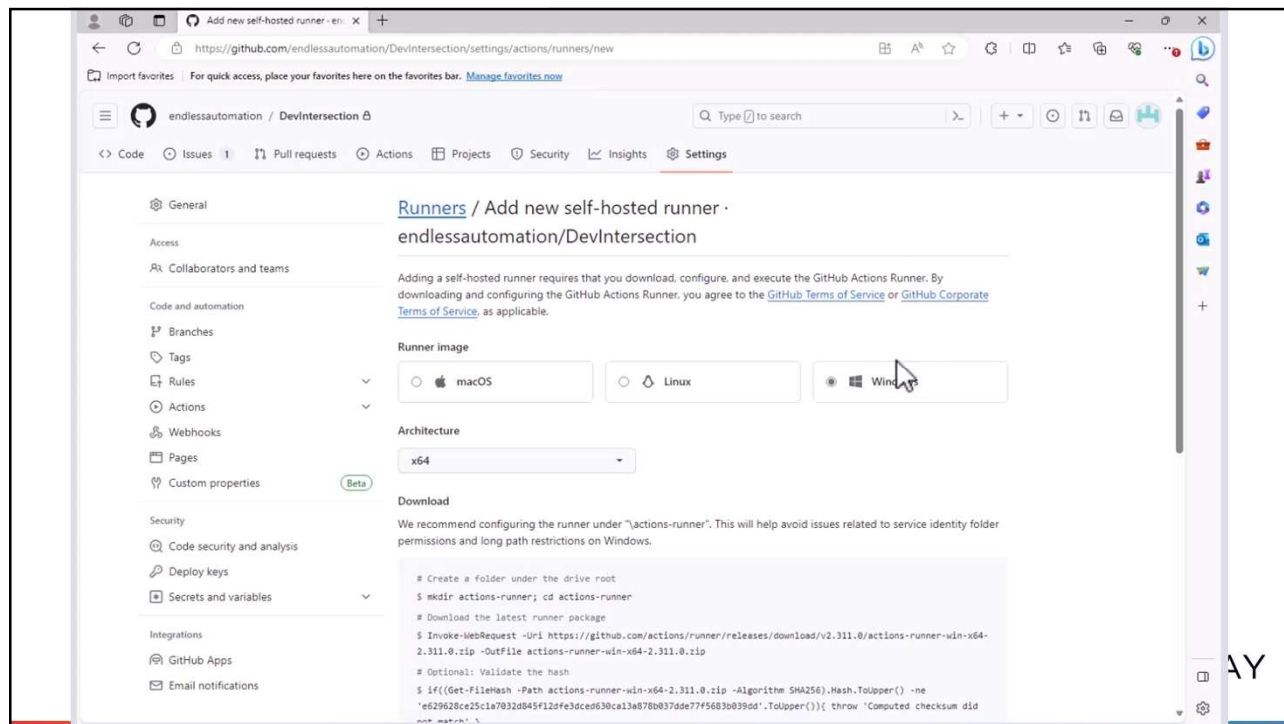
Self-hosted Runners



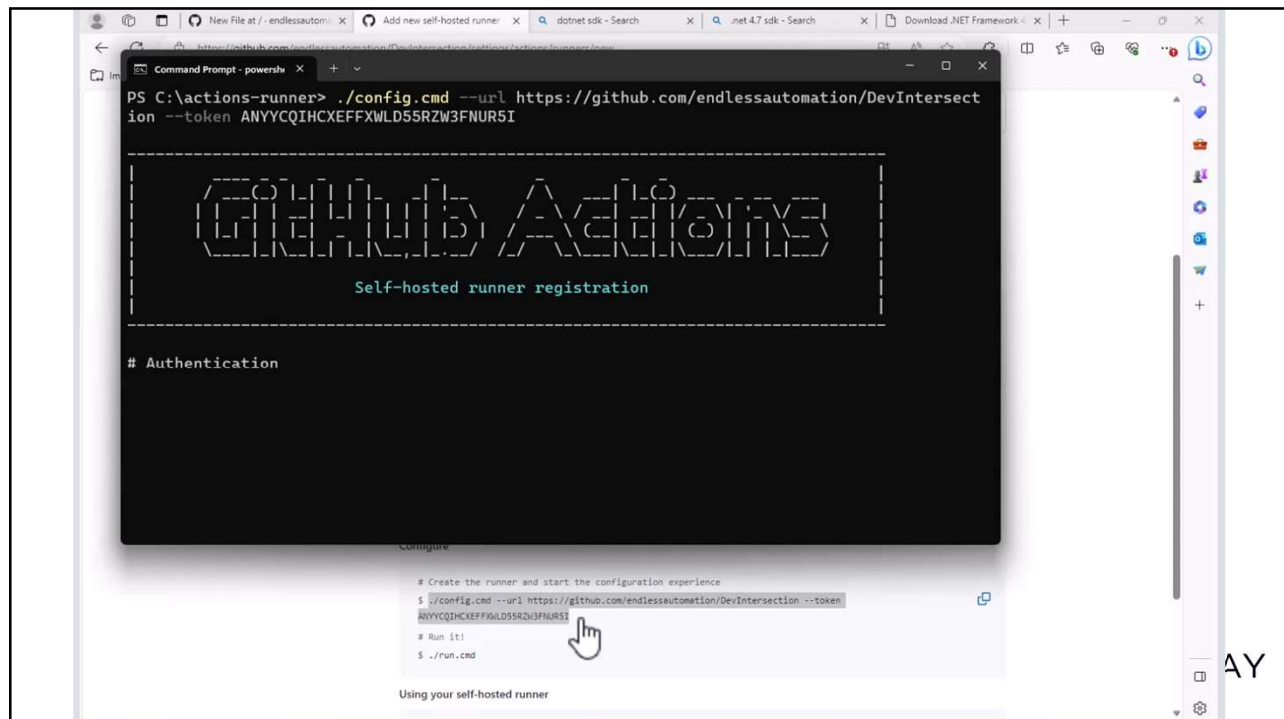
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Code Validation

- Does the code build?
- Does it meet basic tests?
Fix it before it gets to QA!

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Code Validation

```
name: Validate Development Branch
```

```
on:
```

```
  pull_request:
```

```
    branches: [ "dev" ]
```

```
  workflow_dispatch:
```

```
jobs:
```

```
  buildCode:
```

```
    name: Build SQL Projects
```

```
  runs-on: windows-latest
```

```
  steps:
```

```
    - uses: actions/checkout@v3
```

```
    - name: Add msbuild to PATH
```

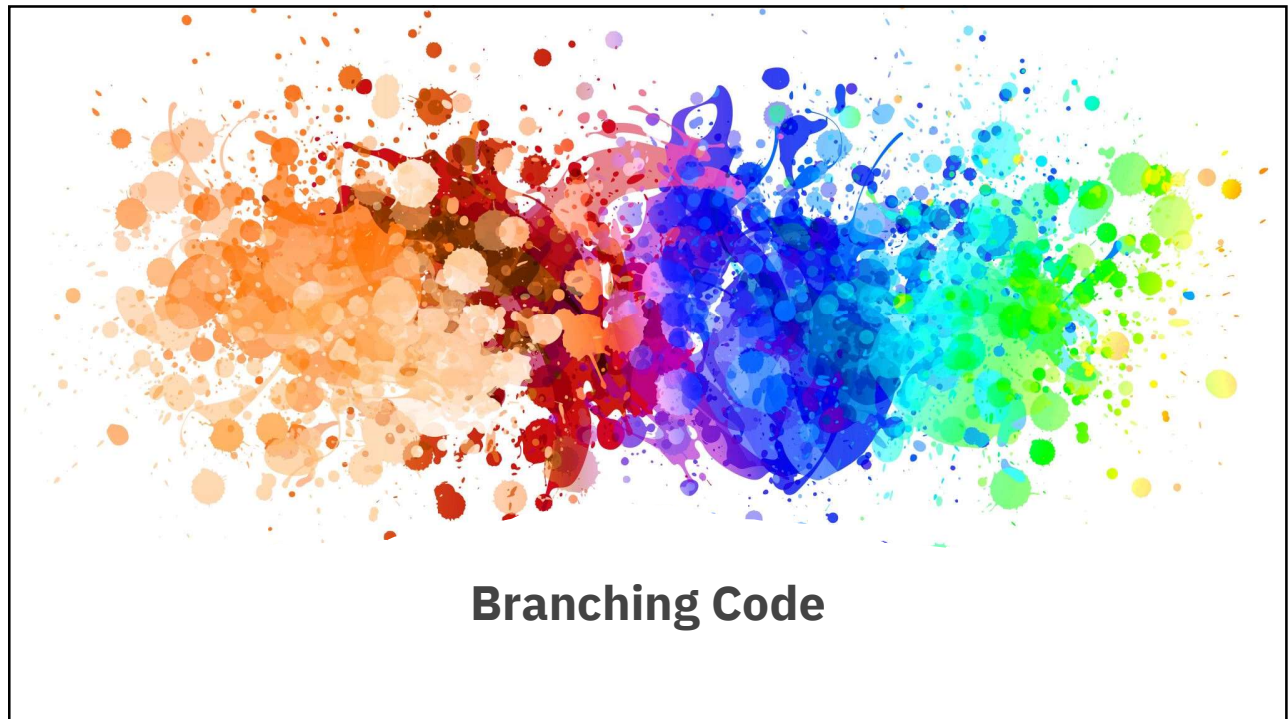
```
      uses: microsoft/setup-msbuild@v1.1
```

```
    - name: Build AdventureWorks DACPAC
```

```
      run: msbuild AdventureWorks\AdventureWorks.sqlproj
```



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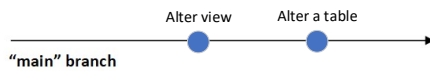


Branching Code

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Branching Strategy

- main branch



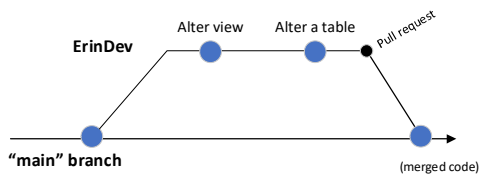
- Harder to determine when to start workflow
 - Trigger after view change?
 - Trigger after table change?



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Branching Strategy

- Developer branch and main



- Changes are merged into main together
- Pull Request (PR) can start automations



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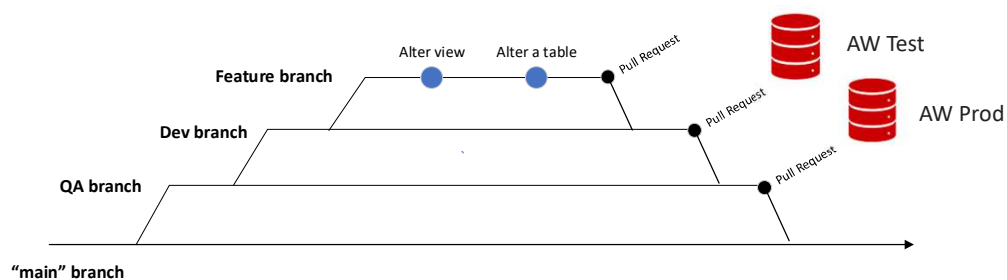
Pull Request

- Developer believes code is finished
- Changes are grouped together
- Associate work items
 - Requirements
 - Bugs
- Require approval by another team member



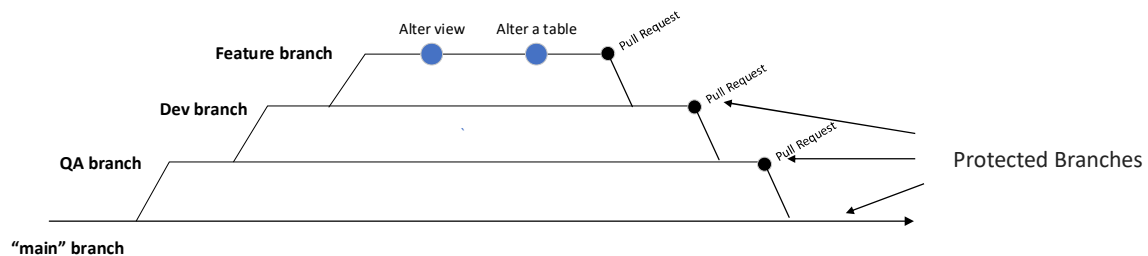
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Potential Branching Strategy in GitHub



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Potential Branching Strategy in GitHub



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Pros and Cons

Pros

- Code collection
- Hotfixes from main to QA

Cons

- Lots of branches to maintain
- Pull requests – wrong target

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Wrap-up

- Power Duo – Visual Studio and GitHub
- Manage Database Schema Alongside Application Code
- Build and deploy changes with little effort



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Questions???



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Link to Today's Content

<https://github.com/endlessautomation/SQLSat>



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