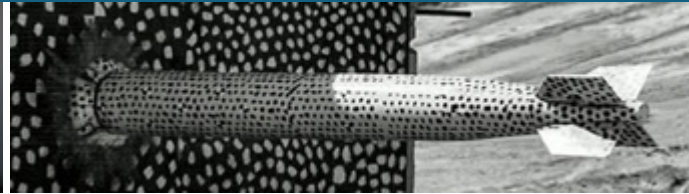
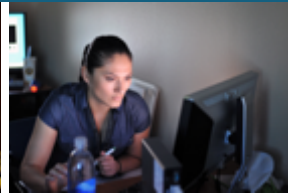




# An Iteration in the Life of a Developer



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Sandia National Laboratories is a multimission laboratory managed and operated by National Technology & Engineering Solutions of Sandia, LLC, a wholly owned subsidiary of Honeywell International Inc., for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-NA0003525.



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# Who we are and what we do



or why you should listen to us about agile and dev stuff

# Who we are



## Team of 7

Integrated DevOps team members



## Years of Experience

>100 years of professional developer experience total  
Least experienced 3 years  
Most experienced 27 years



## Education

4 Master Degrees  
9 Bachelor Degrees  
1 Minor in US History



## Backgrounds

Two ministers  
Former prison guard  
Army Veteran  
Former gym owner  
Former special effects prop designer

# Technologies we use



## Languages

C#

JavaScript

TypeScript

CSS

SASS

HTML

SQL

PowerShell

Python

Bash

## Frameworks

.NET Core

.NET

Angular

Bootstrap

## Technologies

REST APIs

Azure DevOps

Containerization

Git

Virtualization



# Our Code



Oldest code in  
Production since 1994



Newest code in  
Production mere  
moments ago



30 products in active  
development or  
maintenance



More than a million<sup>†</sup>  
lines of code



# Agile

A timeboxed iterative approach to software



# What is agile?

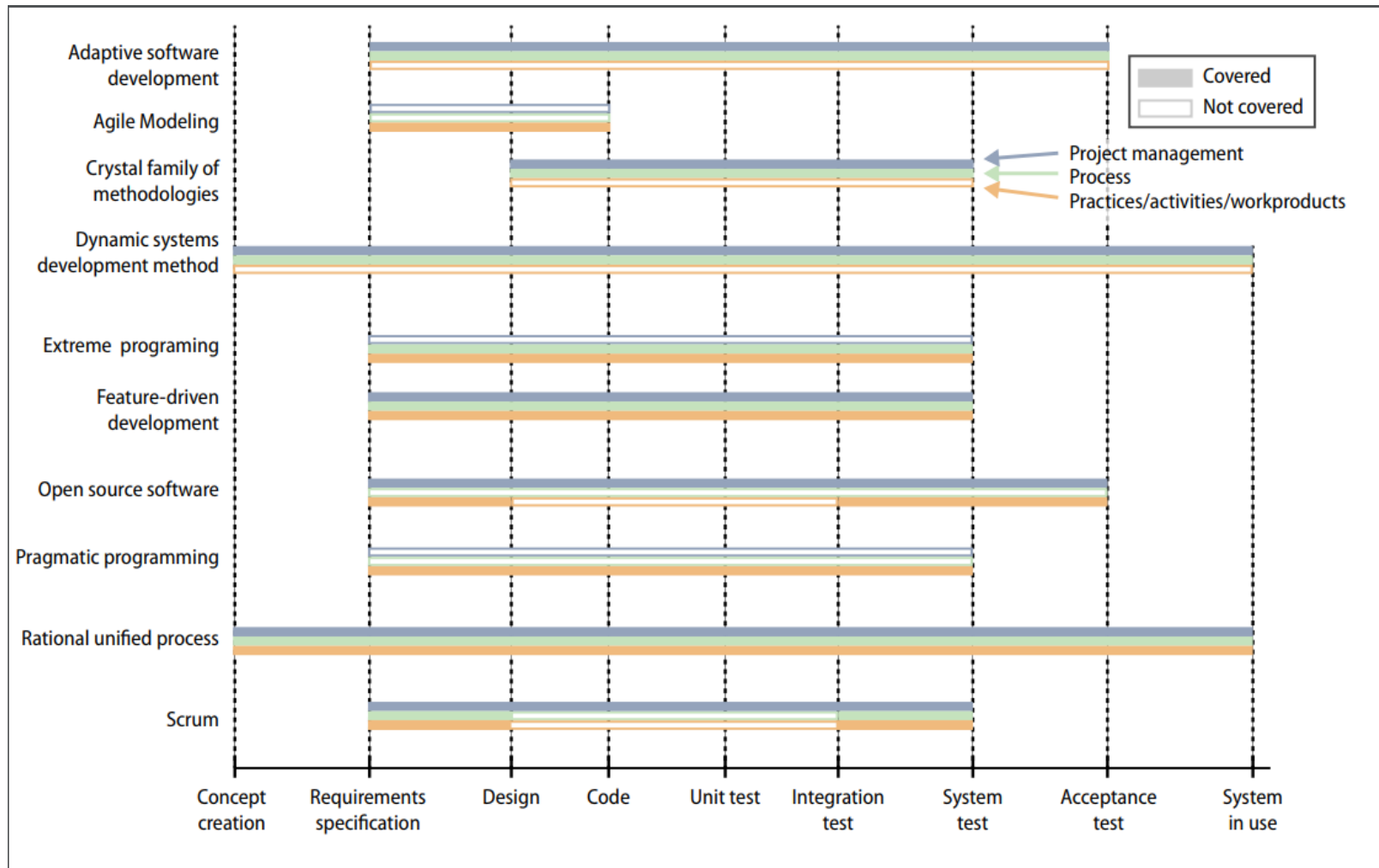
From the agile manifesto

- **Individuals and interactions** over processes and tools
- **Working software** over comprehensive documentation
- **Customer collaboration** over contract negotiation
- **Responding to change** over following a plan



<https://udayanbanerjee.wordpress.com/category/agile/>

# Methodology focus



Abrahamson P, Salo O, Ronkainen J, Warsta J (2002). Agile software development methods: Review and analysis (PDF) (Technical report). VTT. 478.

# Agile is NOT

A methodology

A specific way of developing

A framework

A process

A “tool” you need to buy or license

- A SCRUM Certification does not make you agile



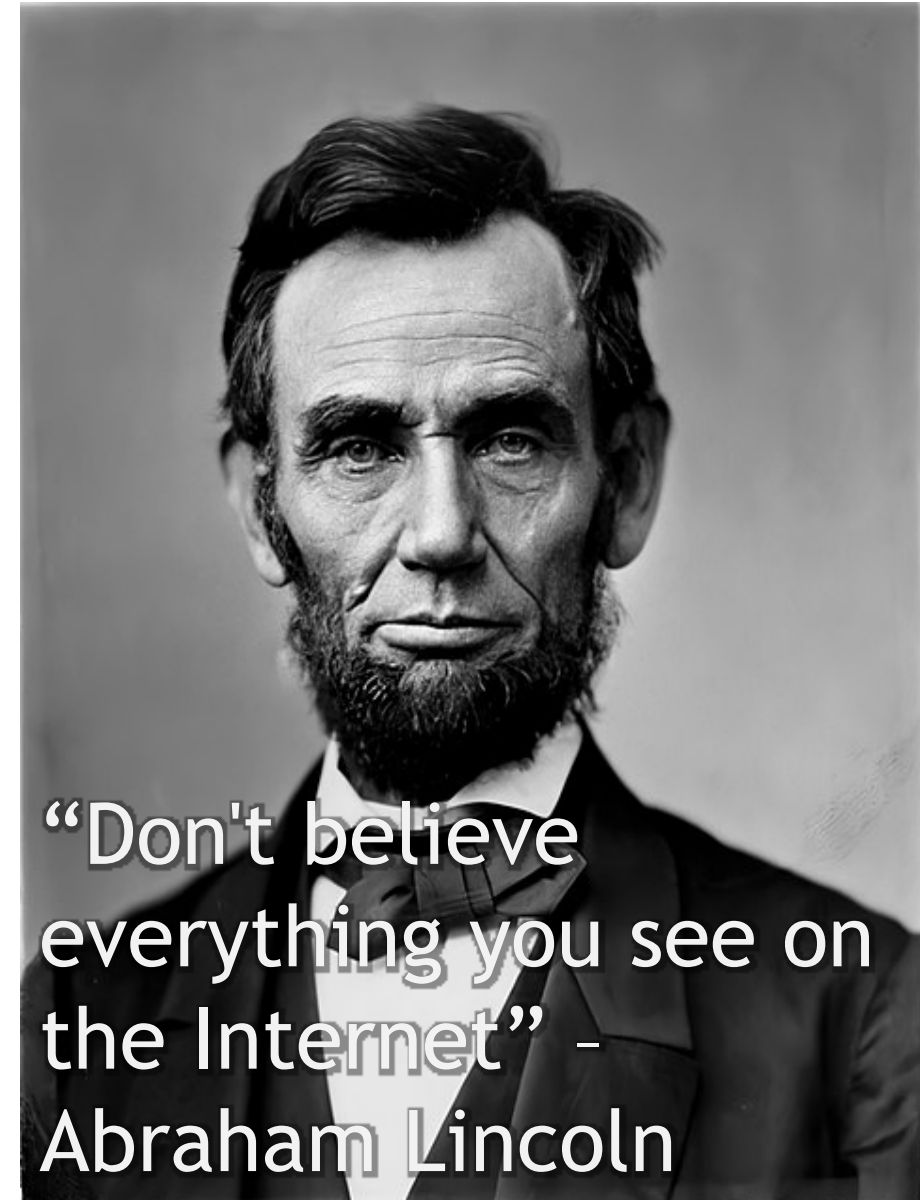
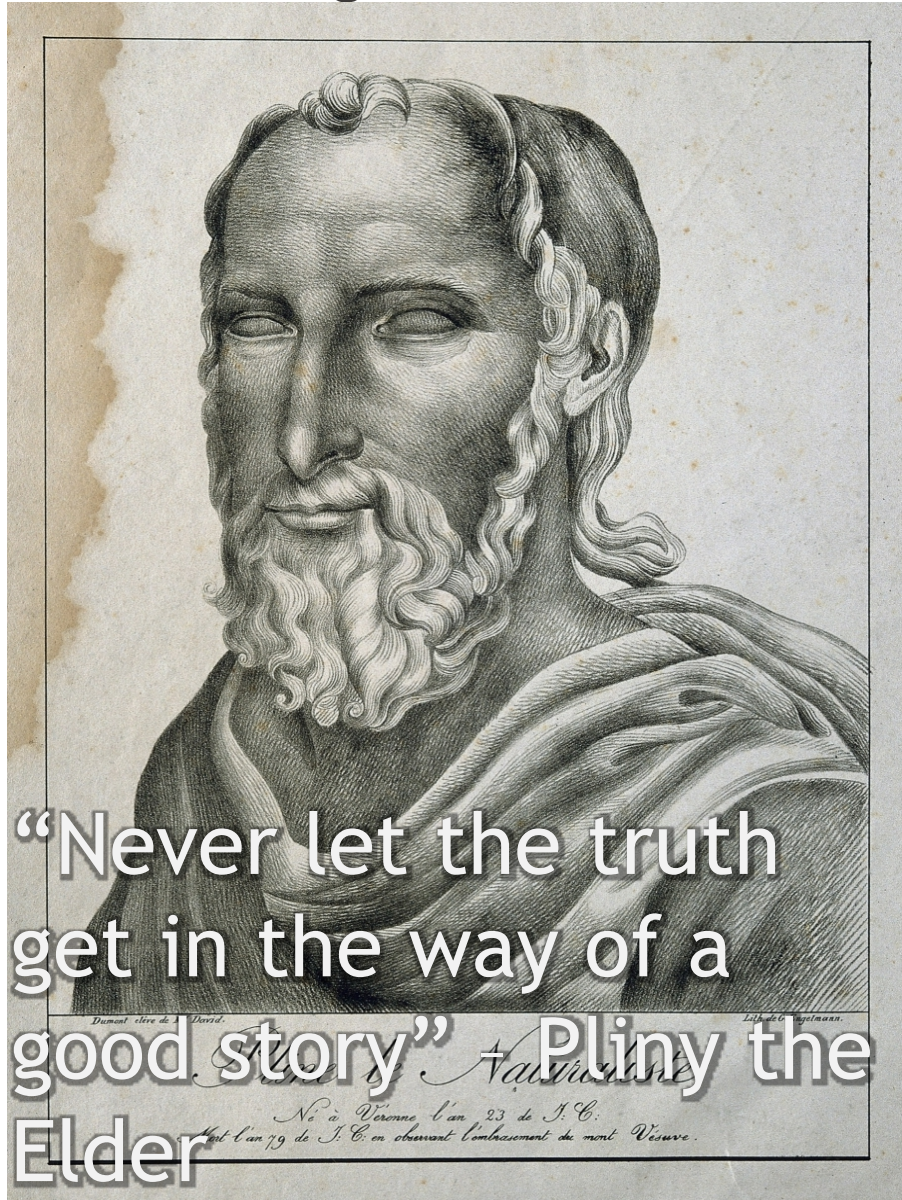




# eXtreme Programming (XP)

Agile teams that have adopted the technical practices from Extreme Programming are the most successful.

We're Agile-ish, and this is what we do



# How we do it... Agile Practices



Acceptance test-driven development (ATDD)

Backlogs

Continuous Integration

Continuous Delivery

Continuous Deployment

Events

- Iteration planning
- Daily standup
- Code review
- Reflection

Information Radiators

Iterative and Incremental Development

Pair programming

Personas

Planning Poker

Test Driven Development

User story

Story Points

Timeboxing

Velocity tracking

Wiki





# An Iteration



We finally got to it



# What's in our iterations



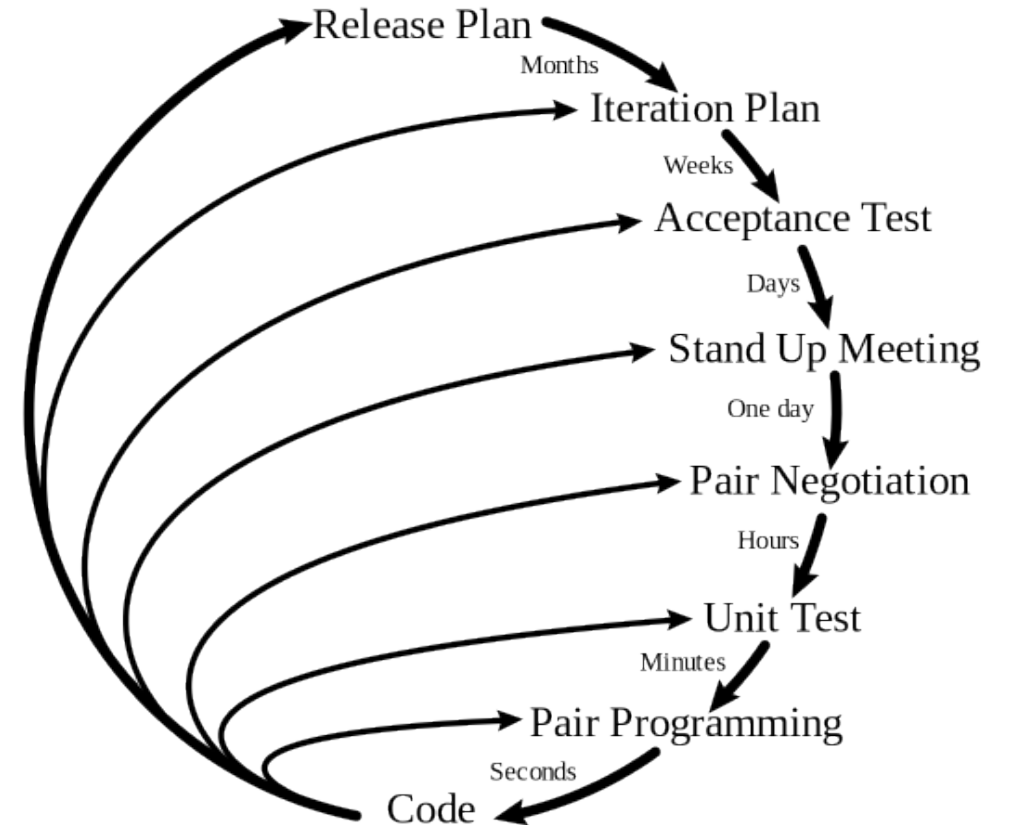
## Meetings

- Planning
- Standing
- Reviewing
- Reflecting

## Developing

- Pairing / Mobbing
- Testing
- Pull Requests
- Continuous Integration Continuous Deployment (CICD)

## Planning/Feedback Loops





# Player Characters (PC) and Non-Player Characters (NPC)



Players  
*Committed*



Non-Players  
*Interested*

Mario and Toad are registered trademarks of **Nintendo of America Inc.** Nintendo owns extensive intellectual property rights in all of its products, including video game systems, game titles, characters, game software, graphics, artwork, and screen shots.

# Day 1 – Iteration Planning



## Meeting Conventions

- Planning poker
  - Point assignment
- Three Hour Meeting
- Focused backlog grooming
- First day of iteration

## Topics

- Determine what we are going to do
- Team Calendar
- Work item discussion
  - Who, What, Where, When, Why and How
- Advocate for fixing specific technical debt
- Implement process changes based on Reflection meeting

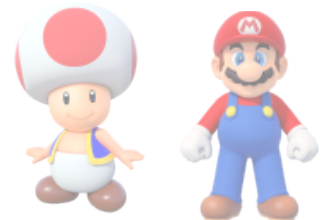
UI Team 2019-01

Backlog Board Capacity

New | + | - | Create query | Column options | ✉

Type: Technical Debt  
Title:  Add

Order	Work Item Type	Title	State	Story ...	Value Area	Iteration Path
1	Bug	Fix error message handling in UI	New		Business	UI\2019-01
2	Chore	> Chadwick, Bruce and Alex should be able to use UI	Active	3		UI\2019-01
3	Chore	> Create Quality Servers	Active	3		UI\2019-01
4	Chore	> Create Dev Servers	Active	3		UI\2019-01
+ 5	Chore	> A server side application should exist for the UI	New	5		UI\2019-01
6	Chore	Create models to represent the API	New	3		UI\2019-01
7	Chore	Create REST client to wrap up the API	New	5		UI\2019-01
8	Technical Debt	In appSettings.Debug.json update "DeveloperOrigin" field to...	Resolved	1		UI\2019-01
9	Technical Debt	Add SPA routing configuration	Resolved	1		UI\2019-01
10	User Story	Chadwick, Bruce and Alex should be able to interact with th...	Resolved	1	Business	UI\2019-01





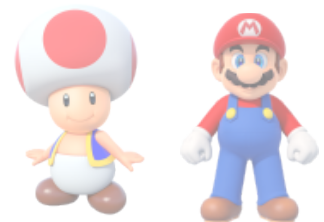
# Daily – Morning Standup

## Meeting Conventions

- First thing in the morning
- Standing
- Limited to fifteen minutes
- Every PC contributes

## Topics

- What we did yesterday
- What's blocking us
- What we plan to do today



# Daily – Development



## Process

- Select work item
- Create branch name branch after work item number and descriptive title
- Write tests based on acceptance criteria
- Hammer out (awesome) code

## Artifacts

- Code
  - Technical debt (we aren't perfect)
  - Bugs (never!)
- Tests
- Pull Requests





# Daily – Mid Day (remote work addition)

## Meeting Conventions

- Time limited - in and out as fast as possible
- Breakouts if necessary

## Topics

- What's blocking us
- Requests for aid





# On Demand – Pairing / Mobbing

## Process

- Explicitly scheduled and blocked on teams' calendar AM/ PM session
- $n^{th}$  tupled sub-teams
- On our team we do minimal research while pairing

## Artifacts

- Designs
- Solutions
- Issue resolution
- Code
- Tests
- Pull requests



⚠️ \*Warning\*: long pairing sessions can be exhausting ⚠️





# On Demand – Work item creation and backlog grooming

## Meeting Conventions

- Small group

## Topics

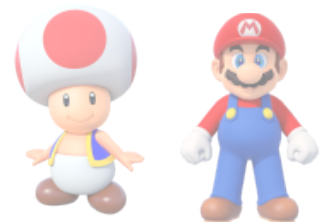
- Possible future work
- Idea refinement

## Process

- Meet with customer
- Determine acceptance criteria
- Prioritize work

## Artifacts

- Work items with acceptance criteria
  - User stories
  - Technical debt
  - Chores
  - Bugs



# On Demand – Pull Request Review



## Process

- Automated Verification
  - Build results
  - Test runs
- Human Verification
  - Code review
  - Functional testing
  - Code comments
- Code creator addresses issues by iterating and amending code

## Artifacts

- Merged code
- Work item resolution
- Identified technical debt
- Development build release



# Automated Verification Pull Request Review (cont.)



Builds

Releases

Packages

Library

Task Groups

Deployment Groups

Build NWISApi (Branch)\_2019.4.30.7

Build Phase

Job

Initialize Job

Get sources

dotnet restore

dotnet publish

Copy Files to: \$(Build.BinariesD...

Publish Artifact: nwisapi

Build an image

Push an image

Post Job Cleanup

Integration Tests Phase

Job

Initialize Job

Get sources

Get BuildName and Select a Po...

Run a Docker command

Run an NWIS API MSSQL image

Update AppSettings

Copy files to NWIS API from \$(...

Create NWISApi Site on WebQ...

Update NWIS API WebConfig

Set Environment Values for tes...

Update AppSettings

dotnet test

Delete NWISApi Site on WebQ...

Post Job Cleanup

NWISApi (Branch) / Build NWISApi (Branch)\_2019.4.30.7

Edit build definition Queue new build... Download all logs as zip Retain indefinitely Release

Build succeeded

Build NWISApi (Branch)\_2019.4.30.7

Ran for 6.4 minutes (NWIS-ProdToolsXp), completed 21.2 hours ago

Summary Timeline Artifacts Tests

Build details

Definition NWISApi (Branch) (edit)

Source 3166

Source version Commit a75ee6a0

Requested by Microsoft.TeamFoundation.System on behalf of Robert H. Engelhardt

Queue name NWIS-ProdToolsXp

Queued Tuesday, April 30, 2019 4:30 PM

Started Tuesday, April 30, 2019 4:30 PM

Finished Tuesday, April 30, 2019 4:36 PM

Retained state Build not retained

Associated changes

3718706 Authored by Robert H. Engelhardt

"json" -> "JSON"

1da2440 Authored by Robert H. Engelhardt

fixes ValueResolver testes affected by automapper upgrade

5461cd0 Authored by Robert H. Engelhardt

updates packages; begins integration of API Client

#17311

1ea3d92 Authored by Robert H. Engelhardt

added new ProdTools.Utils API Client intergration

Work items linked to associated changes

Task 17311 Update NWIS Api ApiClient to consume new library

Current state is Closed. Currently not assigned to anyone.

Test Results

Completed Runs

Total tests 1715 (+1715)

Passed (1703)

Failed (0)

Others (12)

Failed tests 0 (+0)

New (0)

Existing (0)

Pass percentage 99.3% (+99.3%)

Run duration 1m 32s (+1m 32s)

Detailed report >

Code Coverage

No build code coverage data available.

Tags

Add tag...

Deployments

Environments

NWIS API - PR / Release-213

QA Server

Status

Succeeded



# Human Verification Pull Request Review (cont.)



ProdToolsXP Dashboards Code Work Build and Release Test Wiki Search code in this project

Rafts.Blue Files Commits Pushes Branches Tags Pull Requests Fork Clone

3073 adds file scanning states (with default transition)

Robert H. Engellhardt features/16781-AddScanningStatuses into develop All resolved Delete source branch

Overview Files Updates Commits

**Policies**

**Required**

- 1 reviewer approved
- Work items linked
- Build succeeded

**Optional**

- All comments resolved

**Work Items**

16781 Stephanie and Hiri want their fil...

**Reviewers**

- ProdToolsXP Team via Andrew Steele
- Andrew Steele Approved
- Nick Bachicha

**Labels**

Add label

**Description**

adds file scanning states (with default transition)

Show everything

Add a comment...

Approved by Andrew Steele 3/22/2019

TFSSERVICE 4/26/2019 RAFTS Blue Resolved

<https://swagger>

```
--App Connection String
Server=;Database=;User ID=;Password=;

--DataGrip
jdbc:sqlserver://;database=;user=;password=;
```

**RAFTS Red**

<https://swagger>

```
--App Connection String
Server=;Database=;User ID=;Password=;

--DataGrip
jdbc:sqlserver://;database=;user=;password=;
```

Write a reply... Reactivate







# Weekly – Code Review

## Meeting Conventions

- Single screen
- Topics lead by a PC with a goal
- Roundtable

## Topics

- Code that needs more review than what is covered by a pull request
- Discuss development techniques
- Discuss architecture and core concepts
- Knowledge sharing and education



# Last Day – Reflection



## Meeting Conventions

- One-hour long
- Last day of iteration

## Topics

- Energy level check
- What processes worked
- What processes need refinement
- What did we get done
- What didn't we get done and why





# Questions?



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