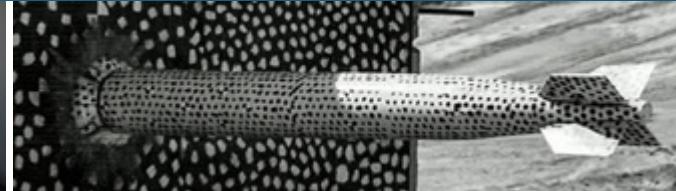
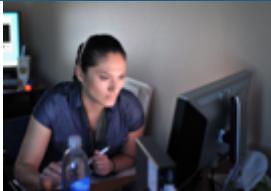




Sandia
National
Laboratories

An Iteration in the Life of a Developer



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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



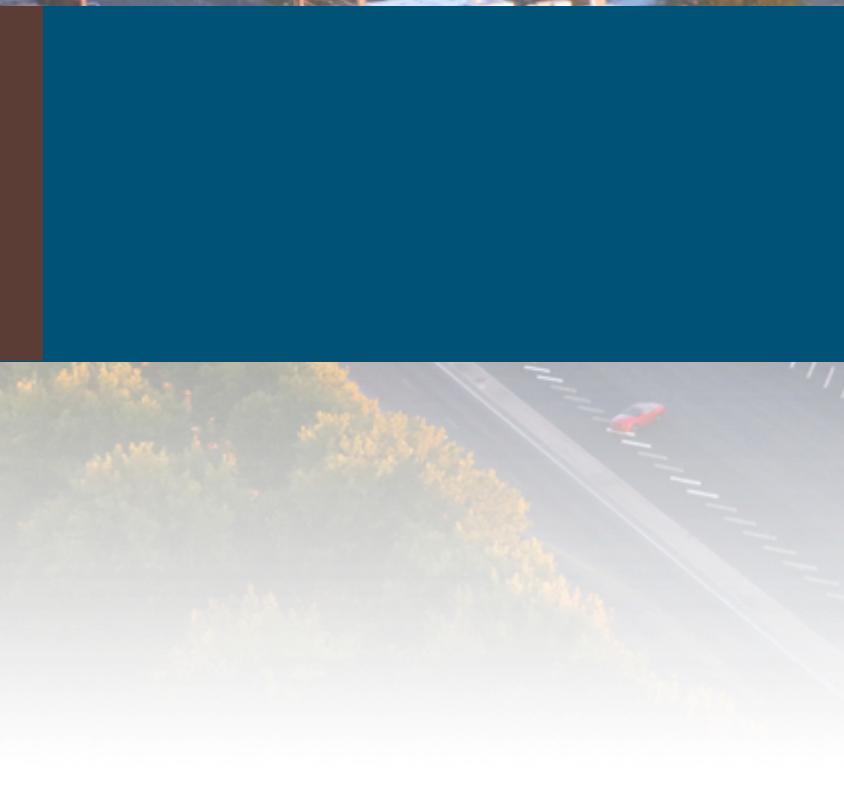
30 products in active
development or
maintenance



More than a million[†]
lines of code



Agile



A timeboxed iterative approach to software

What is agile?

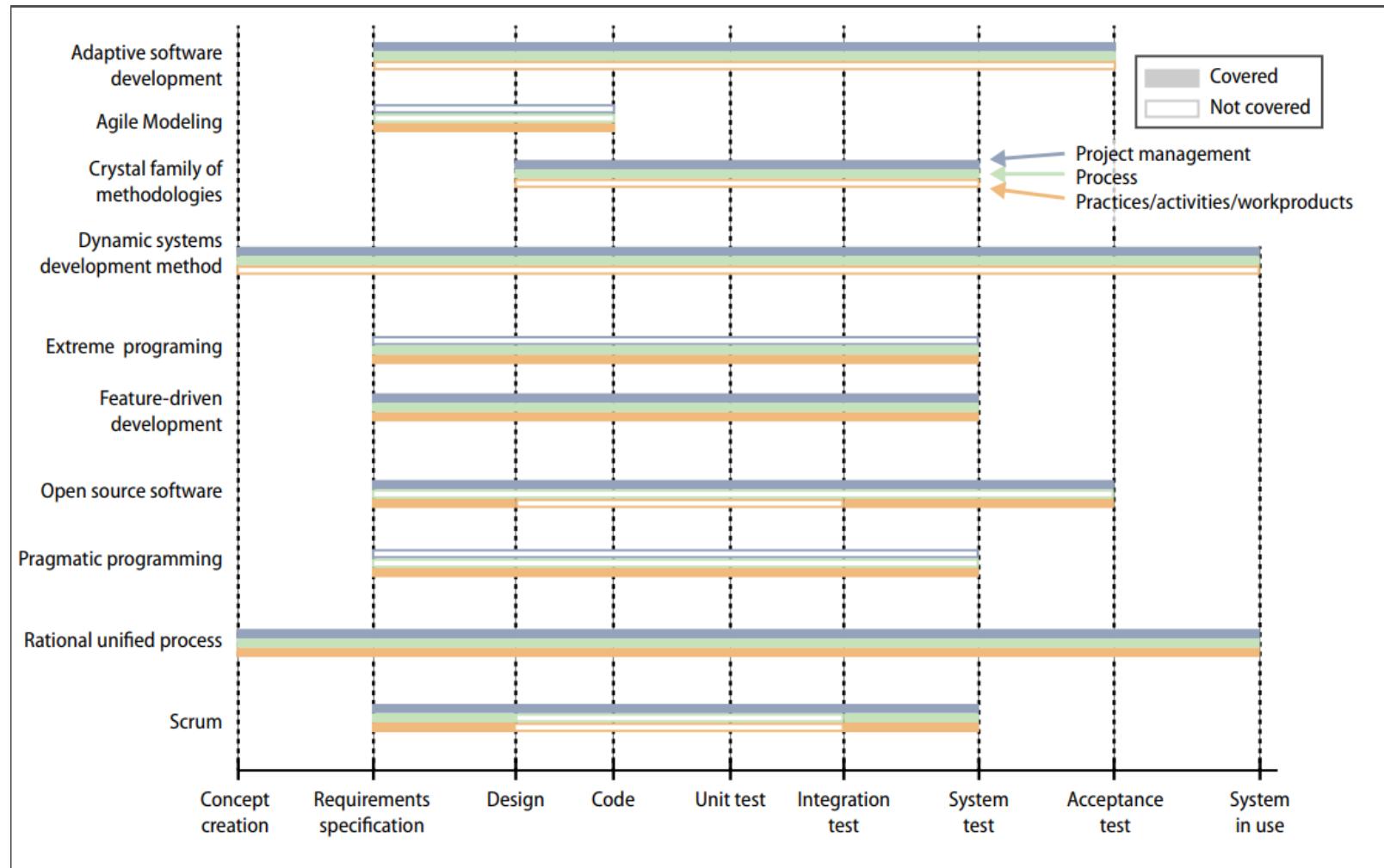
From the agile manifesto

- **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

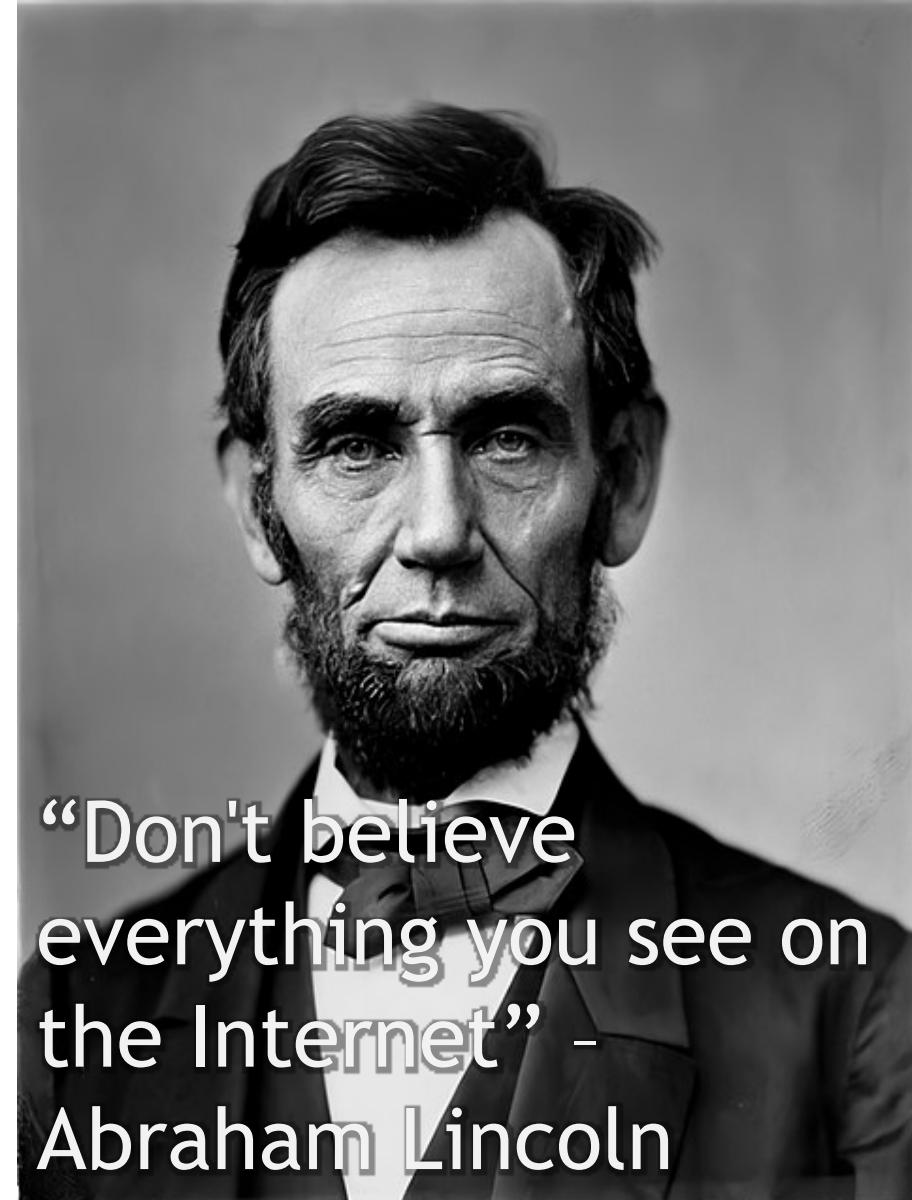
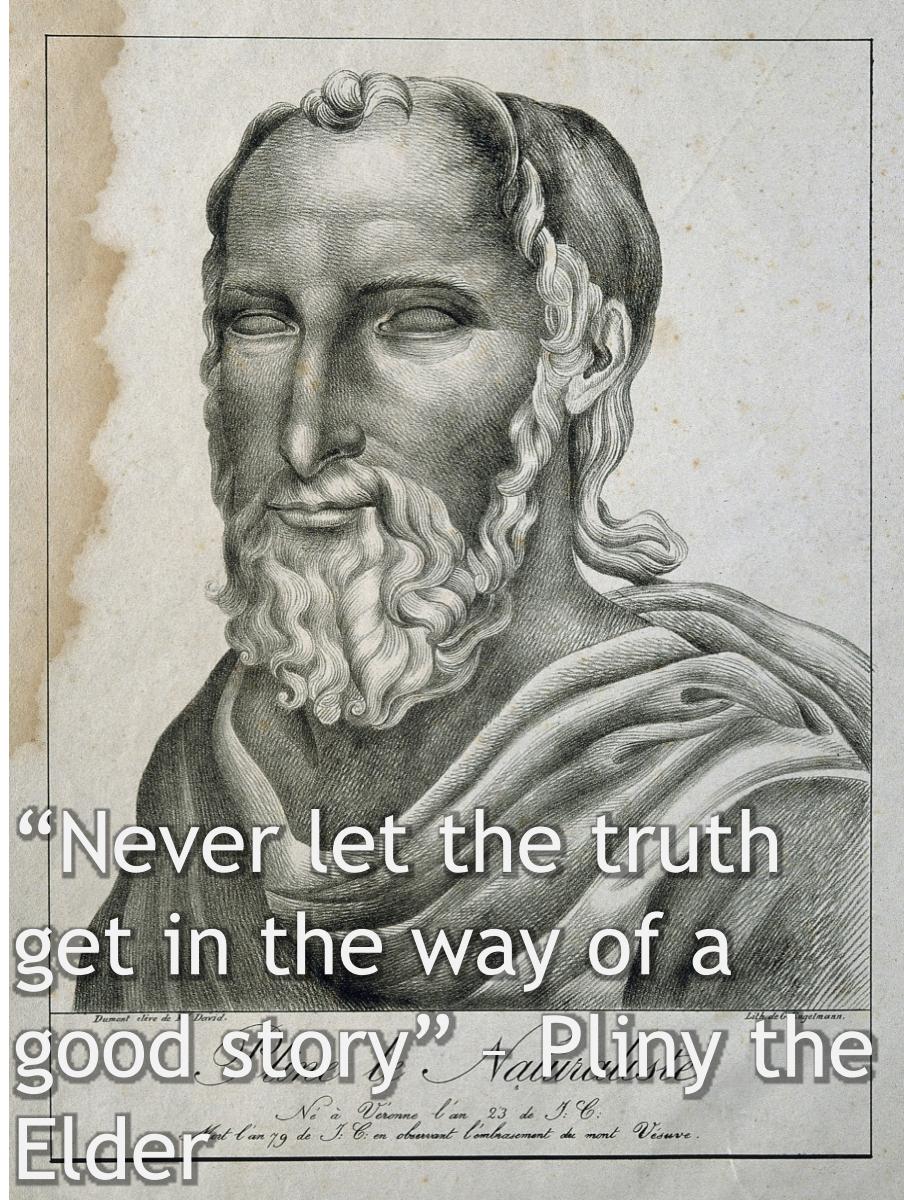
- A SCRUM Certification does not make you agile



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



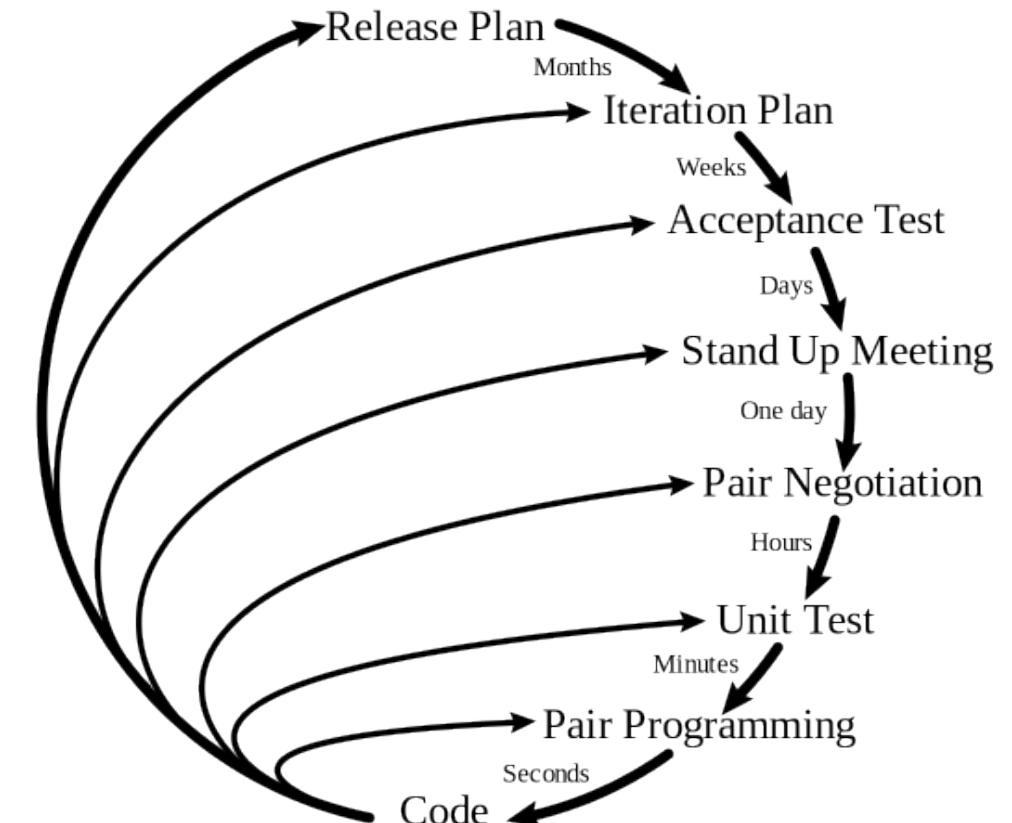
Meetings

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 6 Chore
- Team Calendar 7 Chore
- Work item discussion 8 Technical
- Who, What, Where, When, Why and How 9 Technical
- Advocate for fixing specific technical debt 10 User Story
- Implement process changes based on Reflection meeting

UI Team 2019-01

Backlog							
New		Create query		Column options			
Type	Technical Debt				X		
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.)



ProdToolsXP

Builds Releases Packages Library Task Groups Deployment Groups

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

Build succeeded

Build NWISApi (Branch)_2019.4.30.7 1m 32s
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: 3166
Passed: 1703
Failed: 0
Others: 12
Failed tests: 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.

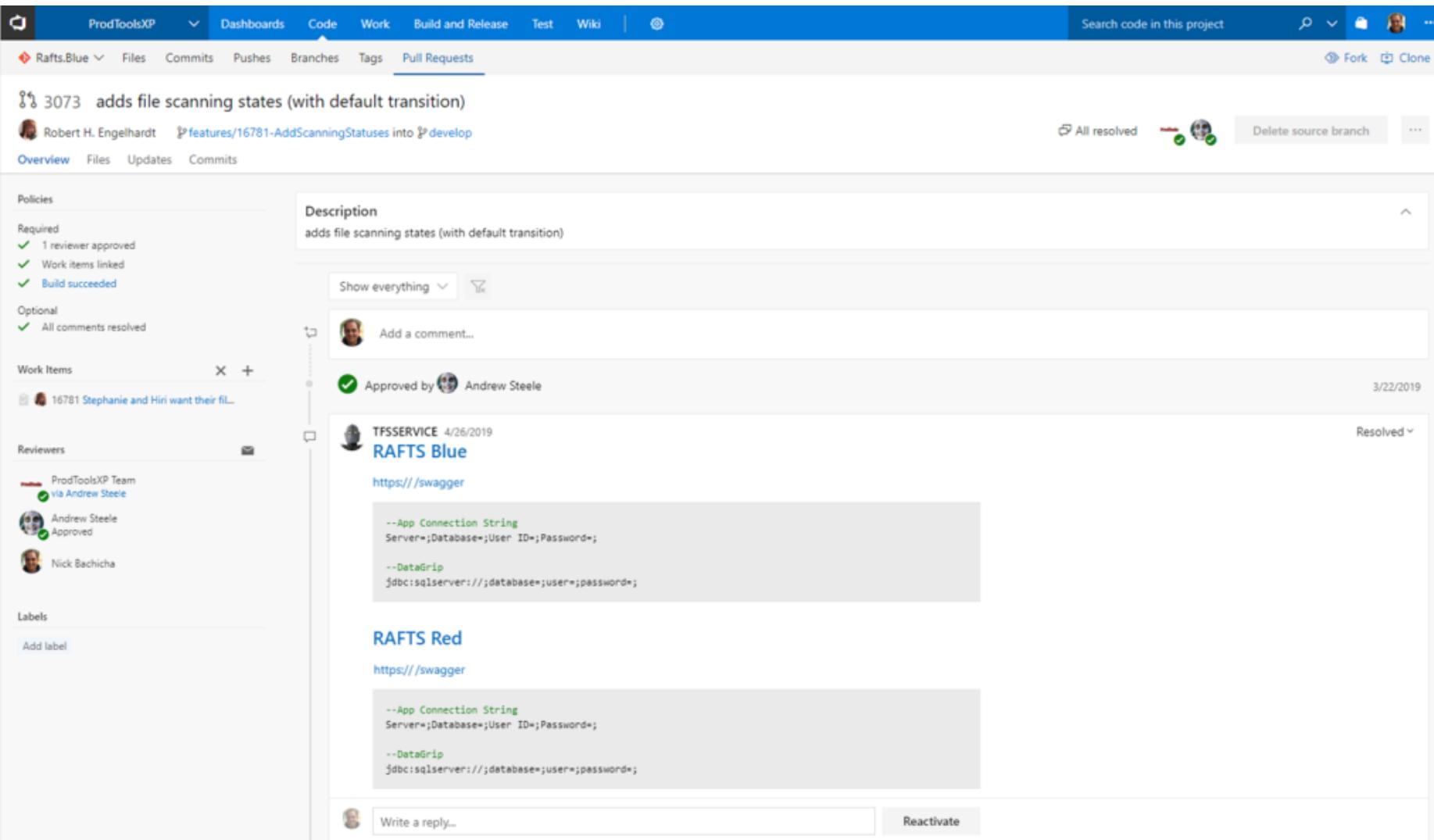
Tags
Add tag...

Deployments

Environments: NWIS API - PR / Release-213
Status: Succeeded
QA Server



Human Verification Pull Request Review (cont.)



The screenshot shows a pull request review interface for a project named "ProdToolsXP". The pull request is titled "3073 adds file scanning states (with default transition)". The review section is divided into two main sections: "RAFTS Blue" and "RAFTS Red".

RAFTS Blue Review:

- Description:** adds file scanning states (with default transition)
- Comments:** Add a comment...
- Approval:** Approved by Andrew Steele (3/22/2019)
- Content:** <https://swagger>

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

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

RAFTS Red Review:

- Description:** https://swagger
- Comments:** Write a reply...
- Content:** <https://swagger>

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

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



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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twitter: @rheone