WELCOME

How Does the Transition From Agile to DevOps Impact Software Cost Estimation?

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February 20 | 1:00 PM ET

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Agile to DEVOPS and its impact on estimation and measurement

SERC February 20, 2019

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Agile Software

- **Agile** software **development** refers to a group of software **development** methodologies based on iterative **development**, where requirements and solutions evolve through collaboration between self-organizing cross-functional teams.

- DevOps Continuous software delivery that unites development and operations teams for faster business results.

Agile Manifesto

Individuals and interactions over processes and tools

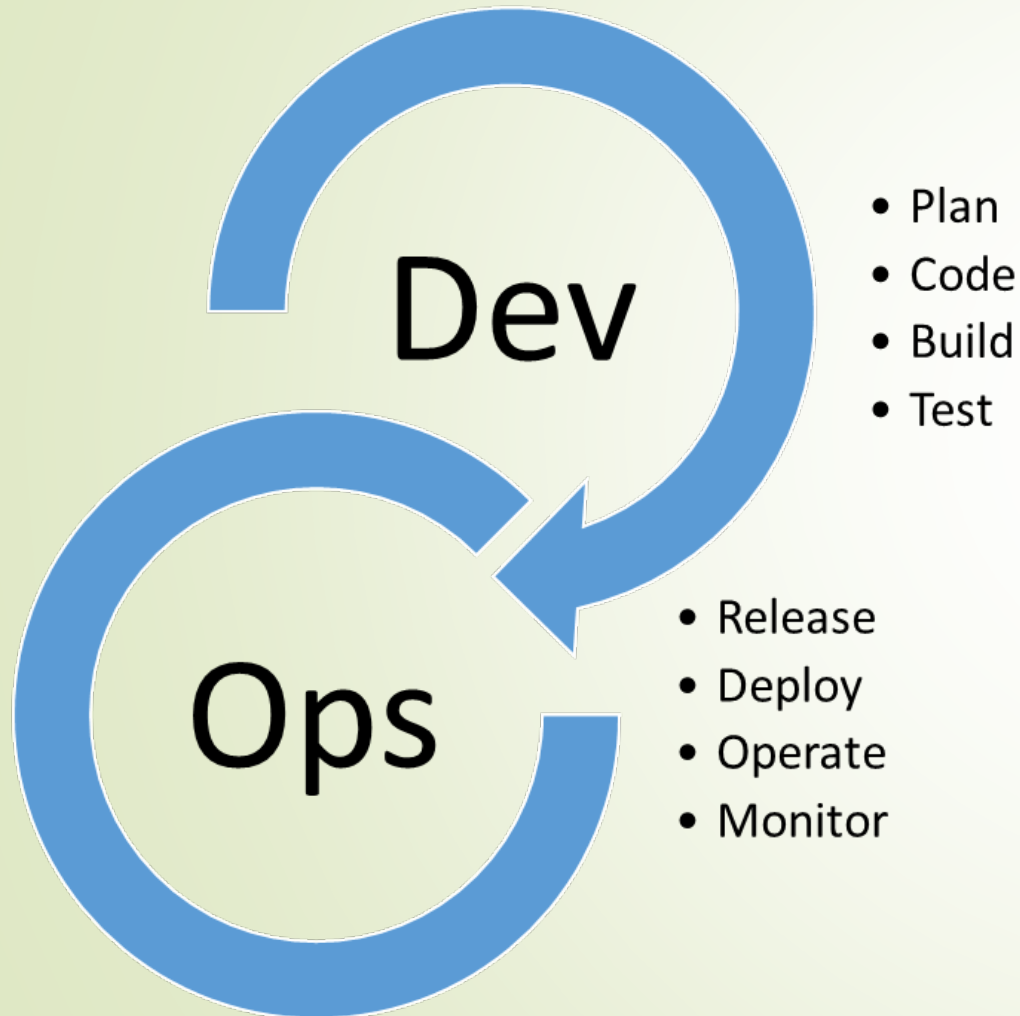*Working software* over comprehensive documentation

Customer collaboration over contract negotiation

Responding to change over following a plan

That is, while there is value in the items on
the right, we value the items on the left more.

Agile to DevOps

- Plan
- Code
- Build
- Test

- Release
- Deploy
- Operate
- Monitor

- The need for DevOps arose from the increasing success of agile software development, as that led to organizations wanting to release their software faster and more frequently.

- As they sought to overcome the strain this put on their release management processes, they had to adopt patterns such as application release automation, continuous integration tools, and continuous delivery.

- The need for DevOps has been complimented by the introduction of numerous tools that support the automation of development, deployment, operations and monitoring.

DevOps

- **DevOps** is a software engineering culture and practice that aims at unifying software development (Dev) and software operation (Ops).

- The main characteristic of the DevOps movement is to strongly advocate automation and monitoring at all steps of software construction, from integration, testing, releasing to deployment and infrastructure.

- DevOps aims at shorter development cycles, increased deployment frequency, and more dependable releases, in close alignment with business objectives.

Minimal Viable Product

- Minimal Viable Product (MVP): Development technique in which a new product is developed with sufficient features for early adopters

DevOps ala Seaver

- DevOps = Agile +++++
  - Development integration with operations is a key change, this usually requires organizational change to successfully implement. Get users, operations and development in synch.
  - Plus Cloud technology: cheap easily deployed development and test environment. Automated software factory that can construct and deploy tested and integrated software solutions.
  - Newer and better tools to manage information and project management of projects (this is not just a DevOps thing)

DevOps Tools

- As DevOps is intended to be a cross-functional mode of working, rather than a single DevOps tool there are sets or toolchains of multiple tools. Such DevOps tools are expected to fit into one or more of the categories listed below, reflective of key aspects of the development and delivery process

  - Plan — requirements development, review and management

  - Code — code development and review, source code management tools, code merging

  - Build — continuous integration tools, build status

  - Test — continuous testing tools that provide feedback on business risks

  - Package — artifact repository, application pre-deployment staging

  - Release — change management, release approvals, release automation

  - Configure — infrastructure configuration and management, Infrastructure as Code tools

  - Monitor — applications performance monitoring, end–user experience

Impact on the Cost Estimation Community

- The information flow is changing, need to estimate high level capability needs statements not requirements.
  - Often buying FTE not requirements
  - Requirements not created till post contract award
  - Can collect, quantify and measure functionality as projects proceed
  - Tracking user stories provides an accurate inventory of delivered capability
- The activities and resources included in estimation need to be adjusted.
  - Systems Engineering activities moved into Software Development (much like commercial systems)
  - Testing folded into software development
  - Data Science/Data Engineering can have an increased role, particularly if analytics are involved
  - Maintenance activities are part of development project
  - Operations staff involved actively with development and test

Impact on the Cost Estimation Community (2)

- Best practices in private sector see PMO & QA functions merging into development.
  - Don't expect these cost to totally disappear for our community, but the potential for increased efficiency does exist.
  - Acquisition change/legislative change may be required

Current plan

- Collaborate to collect data, analyze data, produce measures and recommend changes to business practices related to the estimation and measurement of Agile at Scale and or DevOps projects
- Two working groups (NSA, DHS, NGA, USAF, ODNI, & Census)
  - Project Planning
  - Project Tracking

Plan details

- Analysis of 4 projects
  - Estimating in parallel 3 other DevOps programs
- Collecting metrics on user stories
  - Relationships between Epics, features and stories (every project is different so far).
  - Using the transaction count from the key word scan and the SFP count that follows to normalize the story relationship model
  - Attempting to develop a model/relationship between capability need statements by domain and the number of user stories
- Develop a schema to categorize user stories
  - Functional
  - Testing
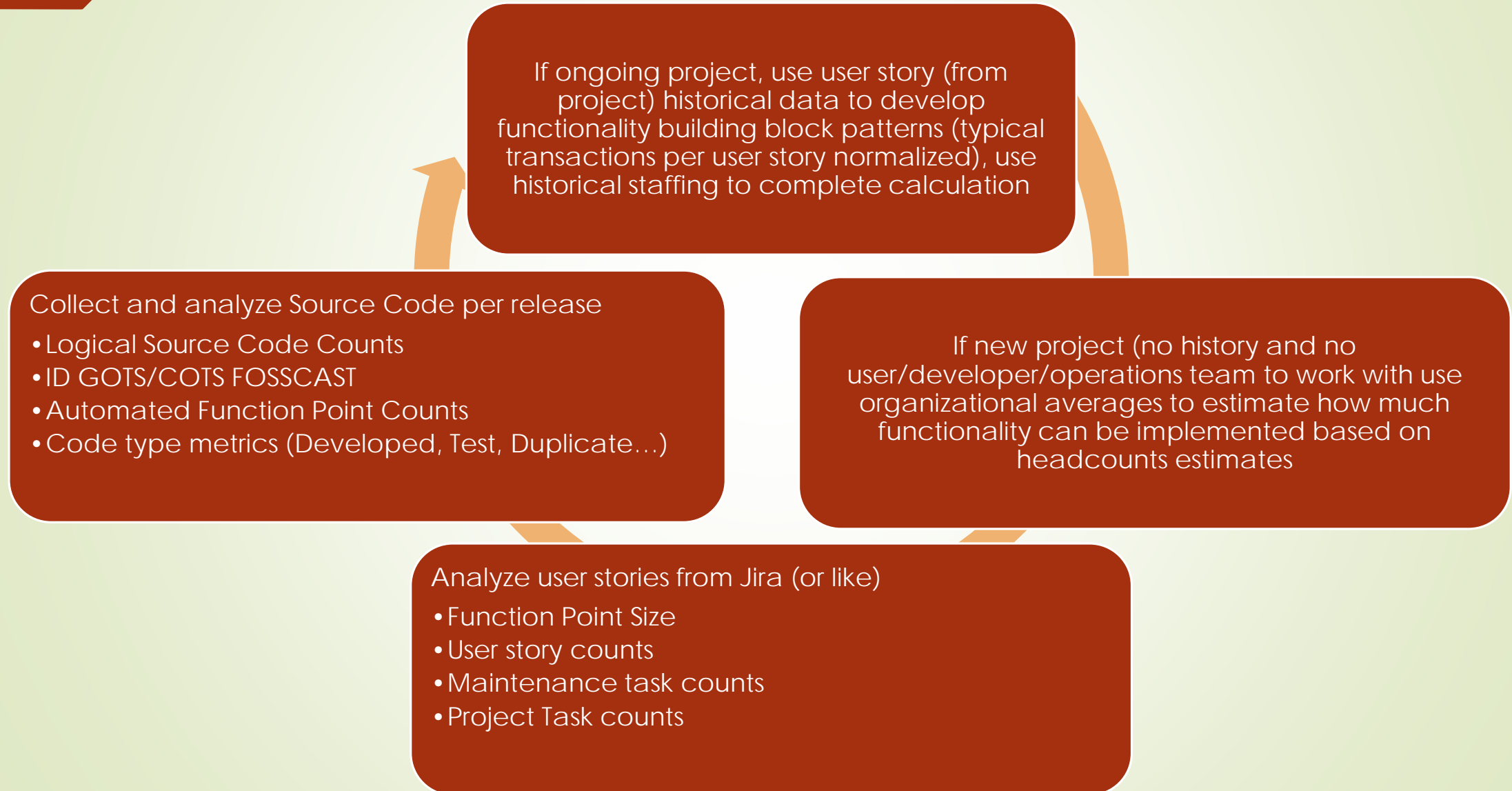 - Task/Activity
  - Maintenance & bug fixes

Words…

Add/Chage/Delete	Report	Query/Read
Accept	Analyze	Browse
Add	Combine	Display
Adjust	Correlate	Enquire
Allocate	Detect	Extract
Apply	Distribution	Inquire
Assign	Export	List
Associate	Generate	Pick List
Change	Identify	View
Create	Inform	
Data Source	Interface	
Delete	Knowledge	
Enrich	Measure	
Enter	Outputting	
Import	Provenance	
Ingest	Provide	
Inputs	Report	
Interface	Tabulate	
Link	Track	
Log		
Maintain		
Make Inactive		
Manage		
Modify		
Provenance		
Purge		
Smart Data Tagging		

- We are collaborating on a "Lexicon" of verbs and how they are used explicitly in the context of software requirements and user stories.

- Also looking at synonyms to have a customized thesaurus for similar verbs

- Intent is to automate an initial reading of requirements to speed up analysis and provide consistency

- Look at verb and noun combinations in phase 2
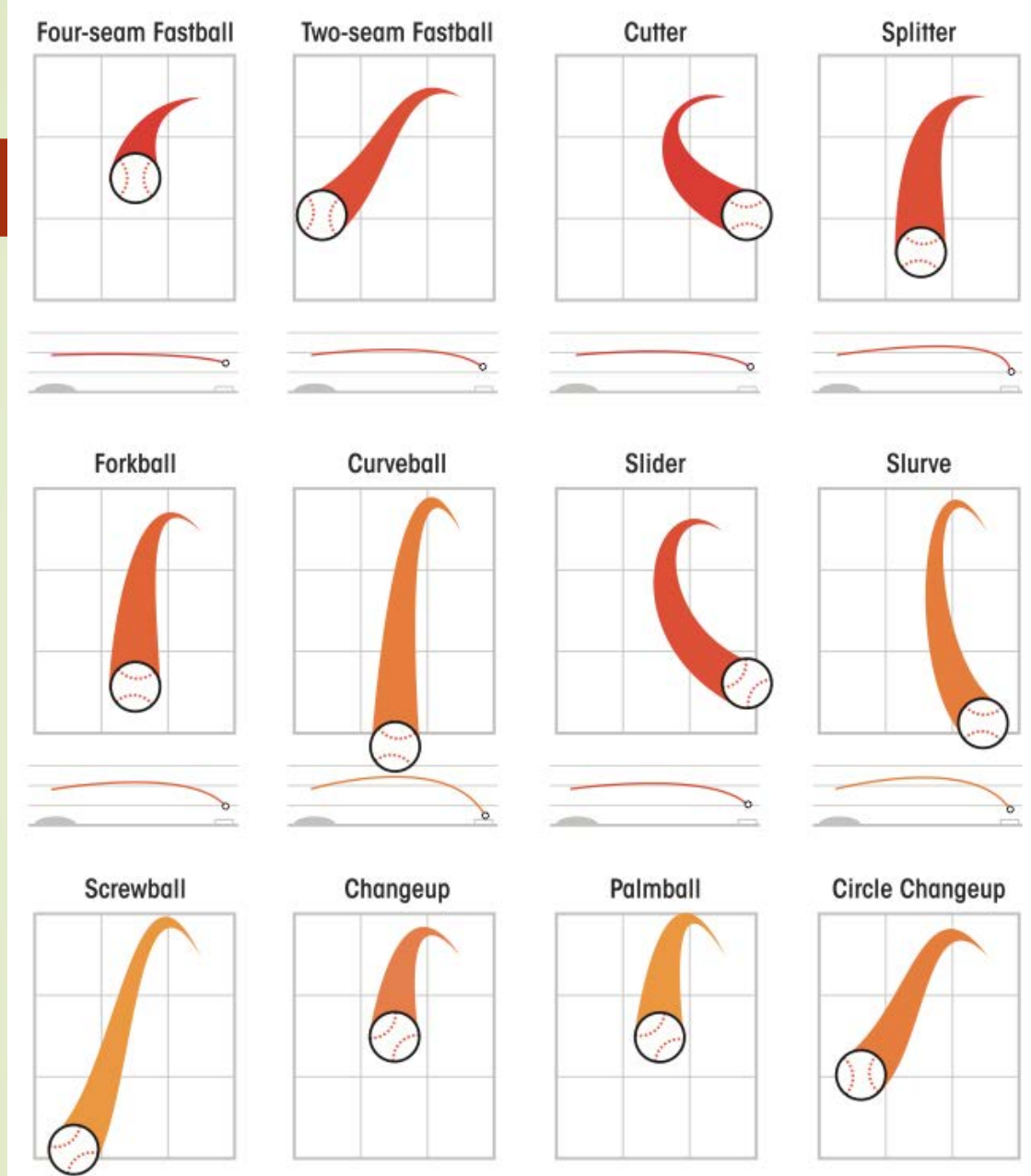
Estimation/Measurement Process DevOps

If ongoing project, use user story (from project) historical data to develop functionality building block patterns (typical transactions per user story normalized), use historical staffing to complete calculation

Collect and analyze Source Code per release
- Logical Source Code Counts
- ID GOTS/COTS FOSSCAST
- Automated Function Point Counts
- Code type metrics (Developed, Test, Duplicate…)

If new project (no history and no user/developer/operations team to work with use organizational averages to estimate how much functionality can be implemented based on headcounts estimates

Analyze user stories from Jira (or like)
- Function Point Size
- User story counts
- Maintenance task counts
- Project Task counts

Functionality Building Blocks

- We are attempting to identify building blocks of functionality

- Building Blocks will vary by domain

- For example a business intelligence system might have the following building blocks
  - Data Ingest
    - Content
    - Meta data
    - Reference Data
  - Data enrichment (user interaction with data)
  - Analytics
    - Basic analytic
    - Medium analytic
    - Complex analytic
    - Machine learning/AI analytic

Building Blocks

	Add	Change	Delete	Query	Report	Save	Transactions	Files	SFP	comment	Hours	FTE (3 month release)
•Data Ingest												
•Content	1			1		1	2	1	16	adding basic mission data to the system	470	1.0
•Meta data	1			1		1	2	1	16	meta data about mission data, time location…..	470	1.0
•Reference Data	1			1		1	2	1	16	adding additional content to mission data to make it more relevant	470	1.0
•Data enrichment	1	1	1	1		1	4	1	25	analyst add data to mission data based upon analysis and interpretation.	737	1.6
•Analytics							0	0	0		-	0.0
•Basic analytic					2		2	0	9	table and chart of table data	267	0.6
•Medium analytic	1	1	1	2	2	1	7	1	39	abiltity for analyst to add or subtract data sets from reports. Query additional data sources	1,137	2.4
•Complex analytic	1	1	1	5	4	1	12	1	62	abiltity for analyst to add or subtract data sets from reports. Query numerous data sources produce multipel report types	1,804	3.8
•Machine learning/AI analytic	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd	

Four-seam Fastball Two-seam Fastball Cutter Splitter

Forkball Curveball Slider Slurve

Screwball Changeup Palmball Circle Changeup

(Image by: http://www.lokeshdhakar.com/)

TruMedia Baseball Analytics for ESPN

To be held at the National Press Club, Washington, DC on April 3 & 4, 2019

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- Keynote Speakers, Panel and Technical Sessions Announced
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UPCOMING 2019 TOPICS:
"Applying DevOps to Complex Multi-Organization Systems" Series

April 10, 2019 | 1:00 PM ET
Dr. Supannika K. Mobasser, Associate Director, Software Systems and
Acquisition Department, The Aerospace Corporation

"Can DevOps Practices Be Applied to Cyber-Physical Systems Development?"
June 5, 2019 | 1:00 PM ET
Dr. Steve Mayner, SAFe Fellow and Principal Consultant, Scaled Agile

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