

How to Collect and Manage Requirements for Successful GIS Projects

Matt Harman

Craig Venker

Requirements

Provide direction for program success



Why Requirements are Important?

Top Ten factors found in “Failed” projects

1. Incomplete Requirements
2. Lack of user involvement
3. Lack of Resources
4. Unrealistic Expectations
5. Lack of Executive Support
6. Changing Requirements & Specifications
7. Lack of Planning
8. Didn't Need it Any Longer
9. Lack of IT management
10. Technical Illiteracy



Why Requirements are Important?

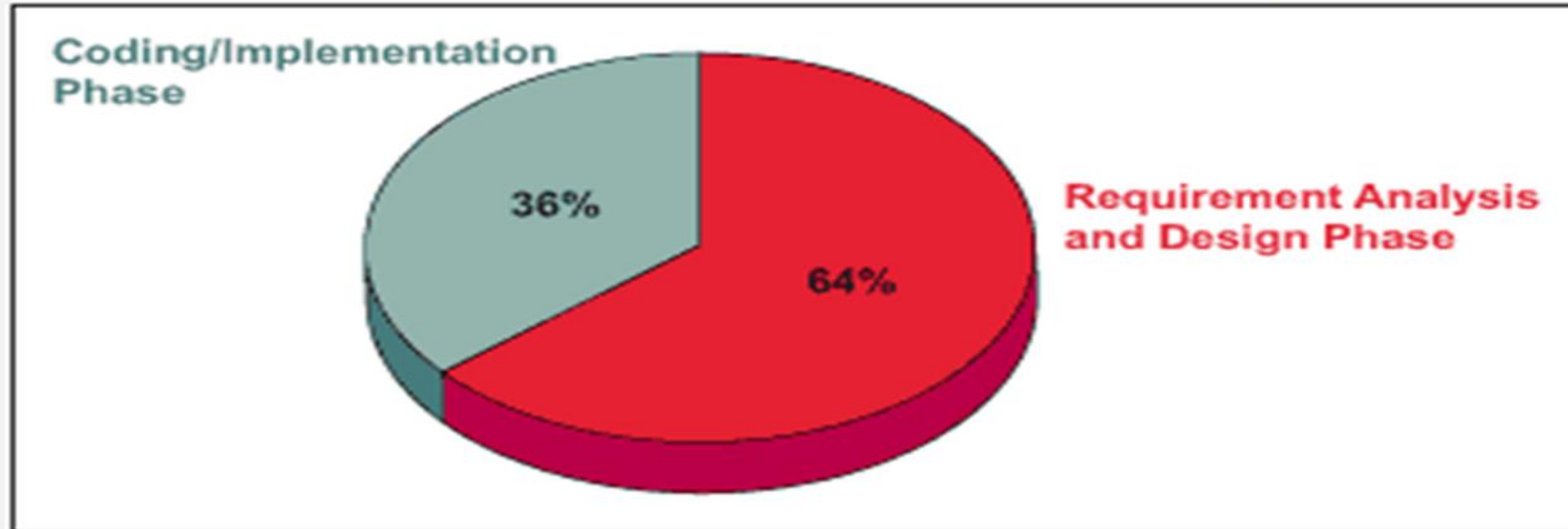
“As many as 71% of software projects that fail do so because of poor requirements management, making it the single biggest reason for project failure.”

Christopher Lindquist states in CIO Magazine, “Fixing the Requirements Mess,”

Why Requirements are Important?

Early mistakes lead to costly fixes

Figure 3: Origin of Software Defects (Source: Crosstalk, the Journal of Defense Software Engineering)

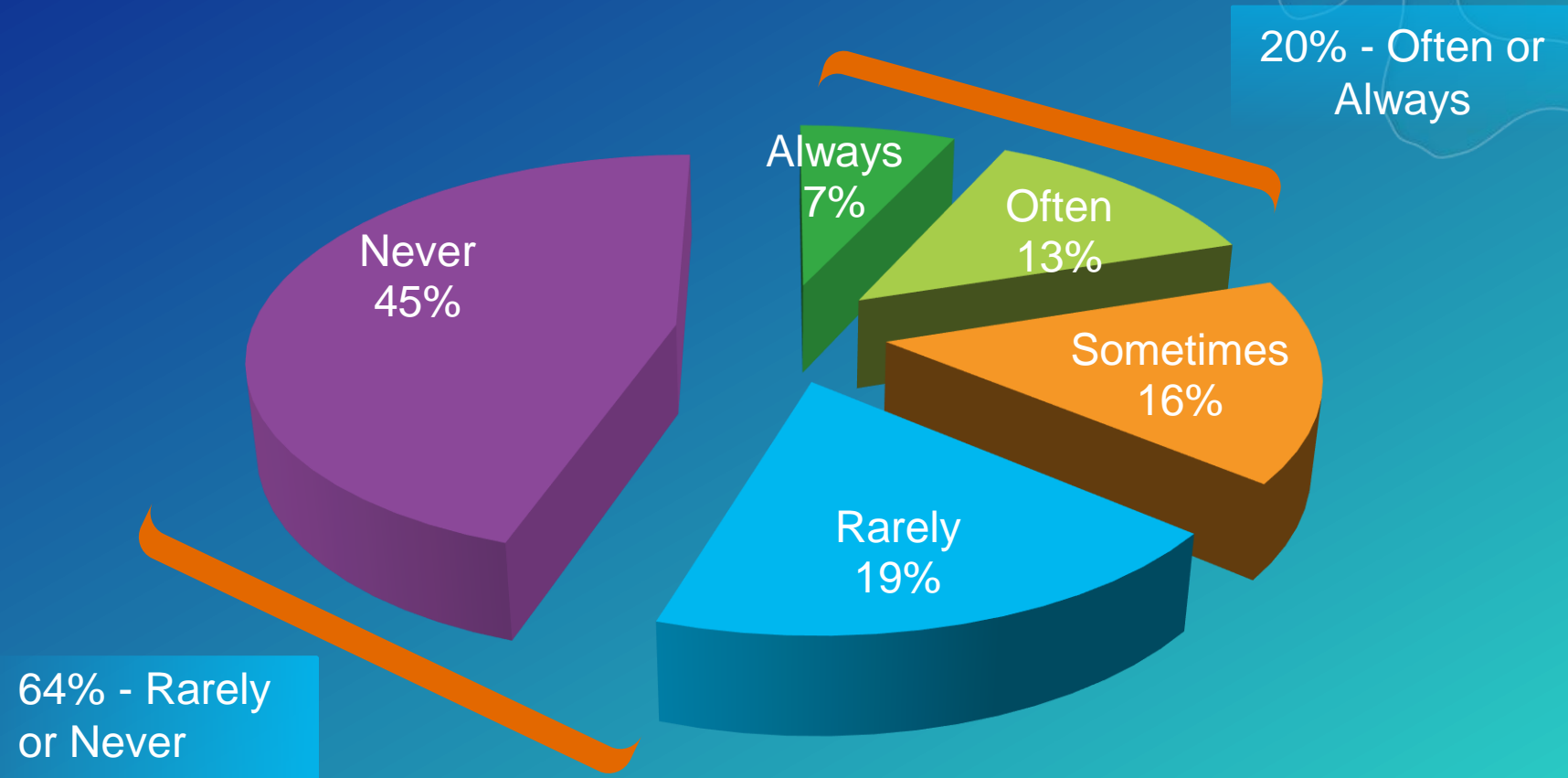


Why Requirements are Important?



Why Requirements are Important?

Requirements evolve over time



Standish Group Study Reported at XP2002 by Jim Johnson, Chairman

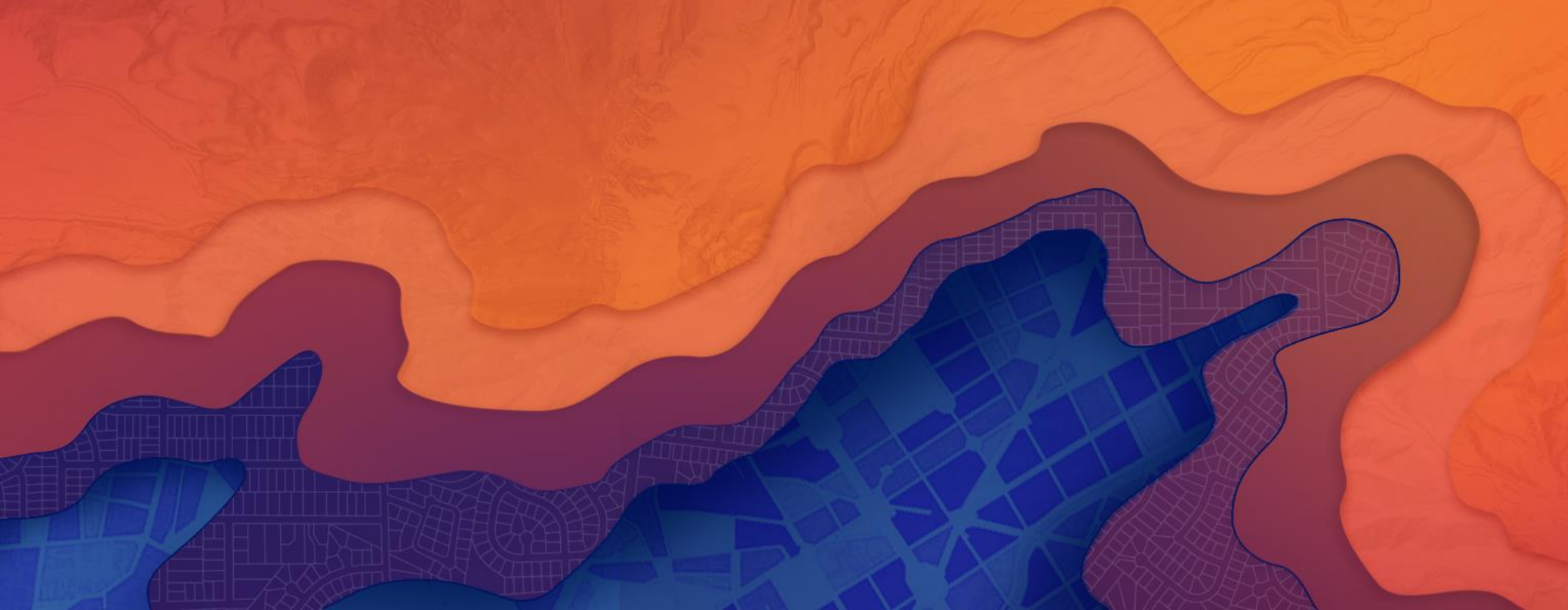
Requirements, User Stories, Oh my...

A User Story is a requirement expressed from the perspective of an end-user goal.

- **We always start with the card...**
- **That drives the conversation...**
- **The user story becomes the requirement...or really, the understanding**



Collect Requirements



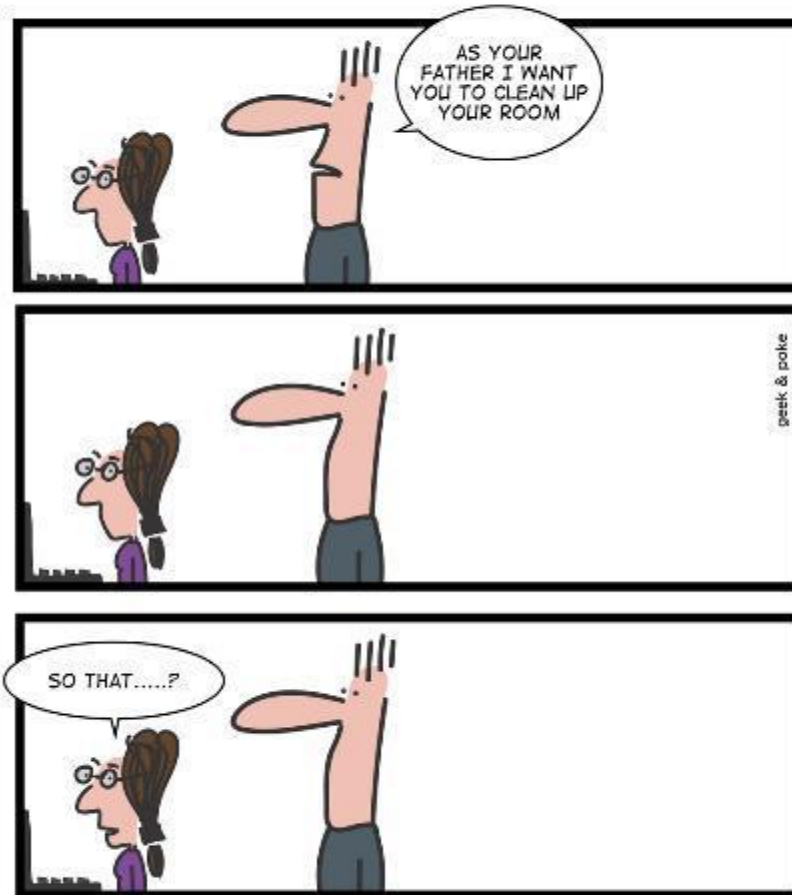
User Story

- Simple, brief descriptions of functionality
- Primarily from a user (role) perspective
- Sized for planning
- Testable
- Why?



As a [role], I can [feature] so that [benefit]

AGILE FAMILIES



MAKE SURE YOUR USER STORY IS CORRECTLY PHRASED

UNDERSTANDING THE FOUR C's

A
Fun
Teacher
Always
Drinks
Coffee



ROY G BIV

HOMES

Kings

Play

Chess

On

Fine

Glass

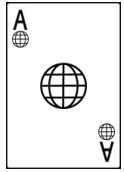
Sets

Let me give you a couple devices to help

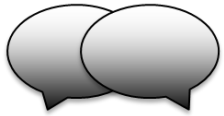
- Three C's – a gimmick pattern to remind us of the process
- INVEST – a mnemonic to help us develop good stories



The 3 C's of User Stories



Card

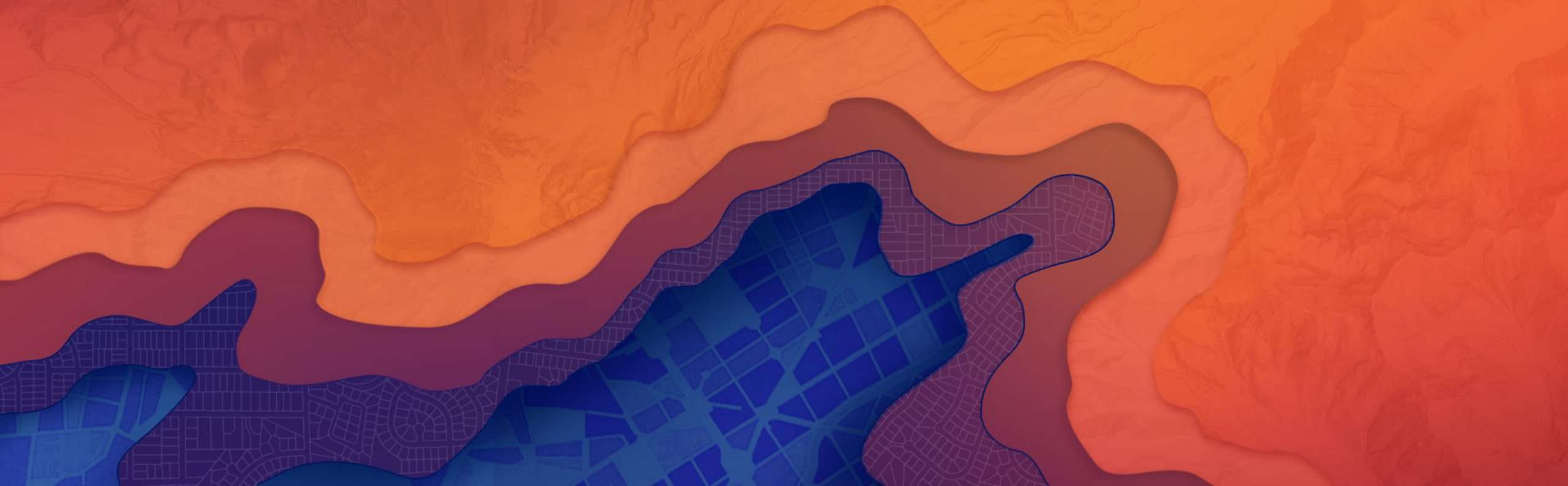


Conversation



Confirmation

The Card



A good user story uses the “INVEST” model:

Independent. *Reduced dependencies = easier to plan*

Negotiable. *Details added via collaboration*

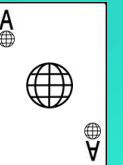
Valuable. *Provides value to the customer*

Estimate-able. *Too big or too vague = not estimate-able*

Small. *Can be done in less than a week*

Testable. *Good acceptance criteria*

**As a field representative,
I want to collect information offline
so that data can be collected
in remote locations.**



As a Farmer, I need to be able to overlay existing data on top of my basemap in order to see different data while working in the field.

39776

Browser Back Warning

As a Groove user, I want to be warned if I hit the 'Back' button in my browser so that I don't lose my data in the application.

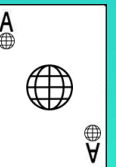
Acceptance:

- user receives pop-up with "Cancel" or "Continue" options
- user can "cancel" and stay on the same page
- user can "continue" and be directed to previous page
- user will be logged out of application if the choose "continue"
- Functionality in IE, Chrome, Firefox browsers

Use paper cards

Write out **concise** user stories

Define **acceptance criteria** for each user story





Keep your stories **visible**



Some things are not about a [user]

As a user interface, I need to look like the following image so that I can be intuitive to use

SUBMIT SERVICE REQUEST

CONTACT NAME

CONTACT NUMBER

SERVICE TYPE

TREE TRIMMING
POT HOLE
TRASH OVERFLOW
OTHER...

PRIORITY: OH ON OL →

Comments

LOCATION

A

B

ON A MAP

MTM

1 Find Your Service Area Help?

New York
Kings
New York City - Brooklyn
Choose a Zone

2 Define Your Service Options

3 What Date is this Effective? Help?
9/18/2013

4 All Done?

SUBMIT REVIEW

Use Selection Tools to Select Zones
Lasso Pointer Clear All

Define Your Service Options

Zip Code	P/D	P	D	
Select All	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
- 90000	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A Ambulance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
P Paratransit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
+ 90001	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

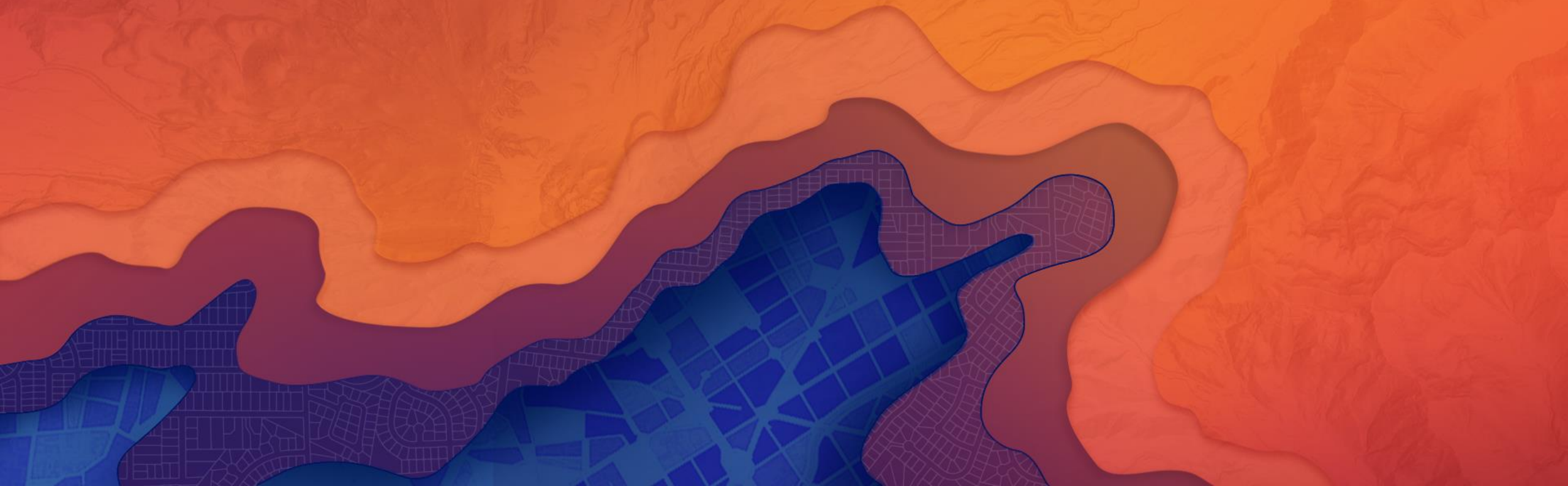
P/D: Pickup & Dropoff P: Pickup Only D: Dropoff Only

Your Transportation Types

A Ambulance P Paratransit



The Conversation



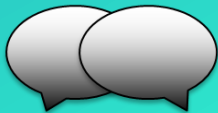
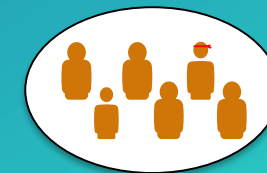
User stories facilitate a **conversation** with the team and with the users...



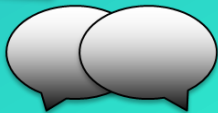
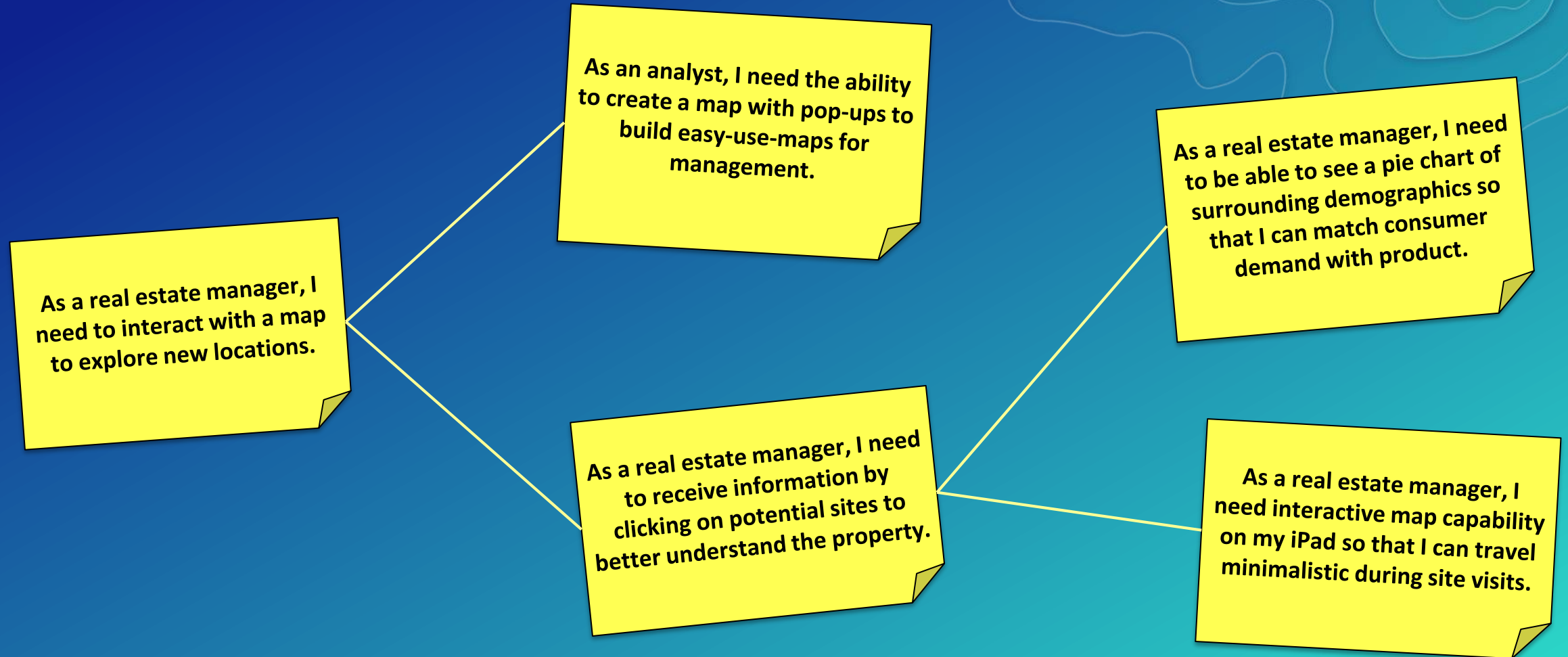
Hey! Something to look at,
talk about, comment on,
react to...

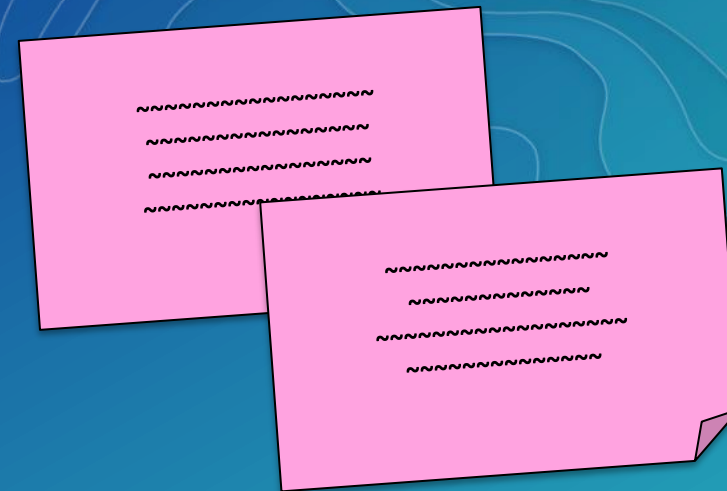


The team

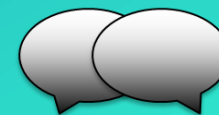


Progressively decompose your stories...

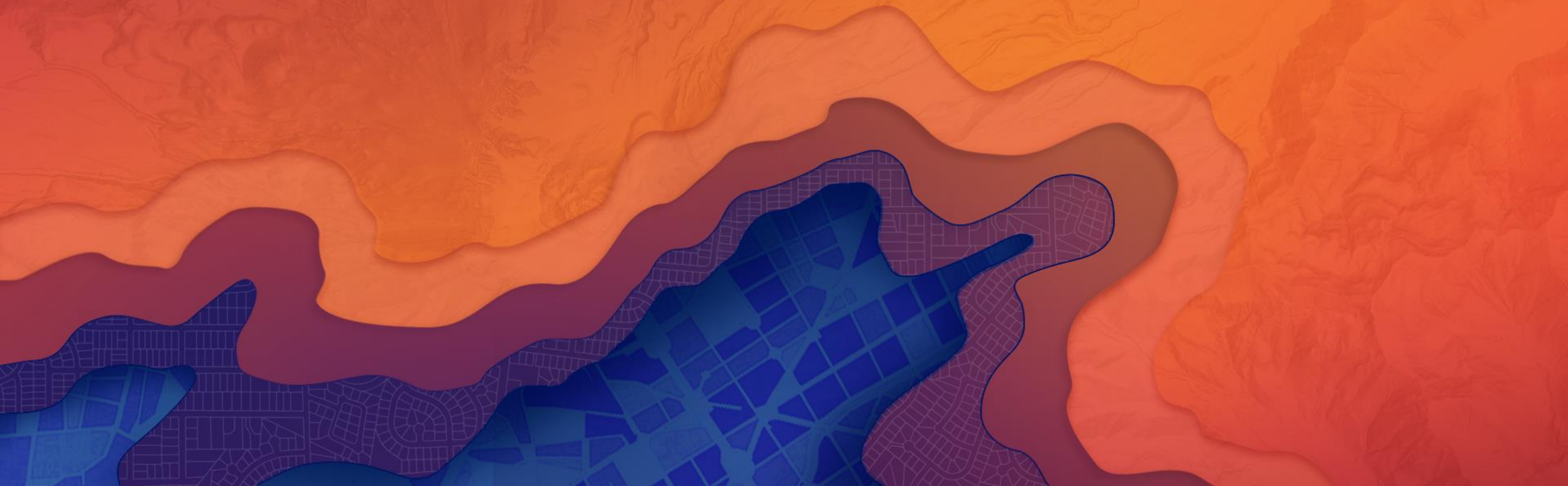




Consider grouping user stories into **themes**



The Confirmation



How do we know when we are done?

Confirmation...the acceptance test

- Given [some context]
- When [some action is carried out]
- Then [something happens]



How do we know when we are done?

Confirmation...the acceptance test

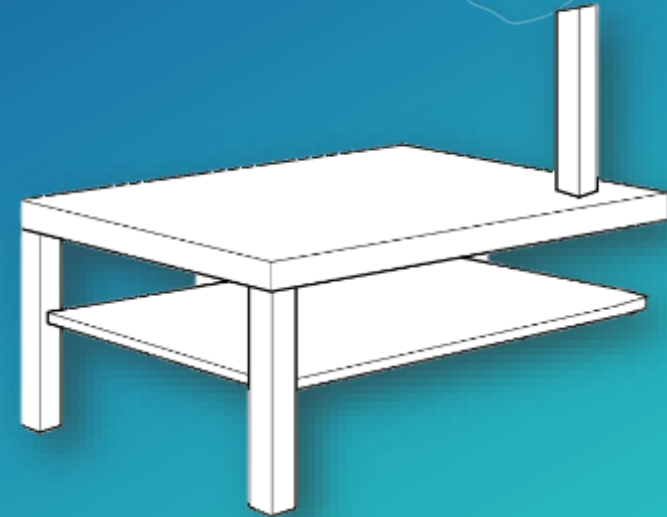
- **Given** I have enabled offline access on my map
- **When** I click on the map to create a feature
- **Then** the feature will be stored locally until I sync with connectivity.



How do we know when we are done?

Couple of things to note...

- Define acceptance just in time...don't waste too much time
- Part of the conversation process
- Acceptance consistency (given...when...expect) is helpful, but not necessary



Definition of Done

I don't do strict...

Examples of practices that might be included in the definition of “done:”

- Acceptance criteria met
- Code is reviewed by another development team member
- Test cases are written
- Unit tests and UI automation tasks are written
- Feature is tested for accessibility
- Feature is tagged for analytics



treehouse

<http://blog.teamtreehouse.com/when-is-a-user-story-done-acceptance-criteria-definition-done>

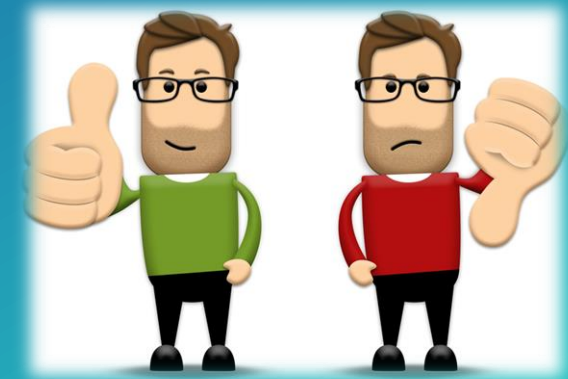
How will I know I've done that?

Bob Hartman – Agile for All

As the author of this presentation, I want to put together a slide deck communicating the Esri way of dealing with requirements so that the audience will take away something meaningful.

How will I know I've done that?

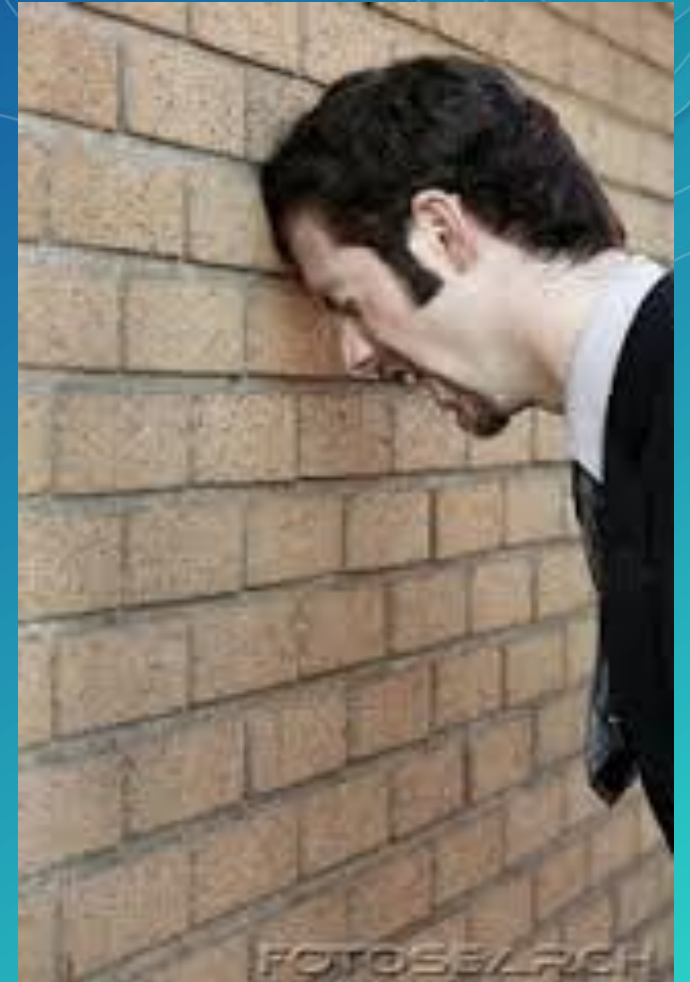
- ☒ Presentation created
- ☒ Audience in attendance
- ☐ Someone learns something



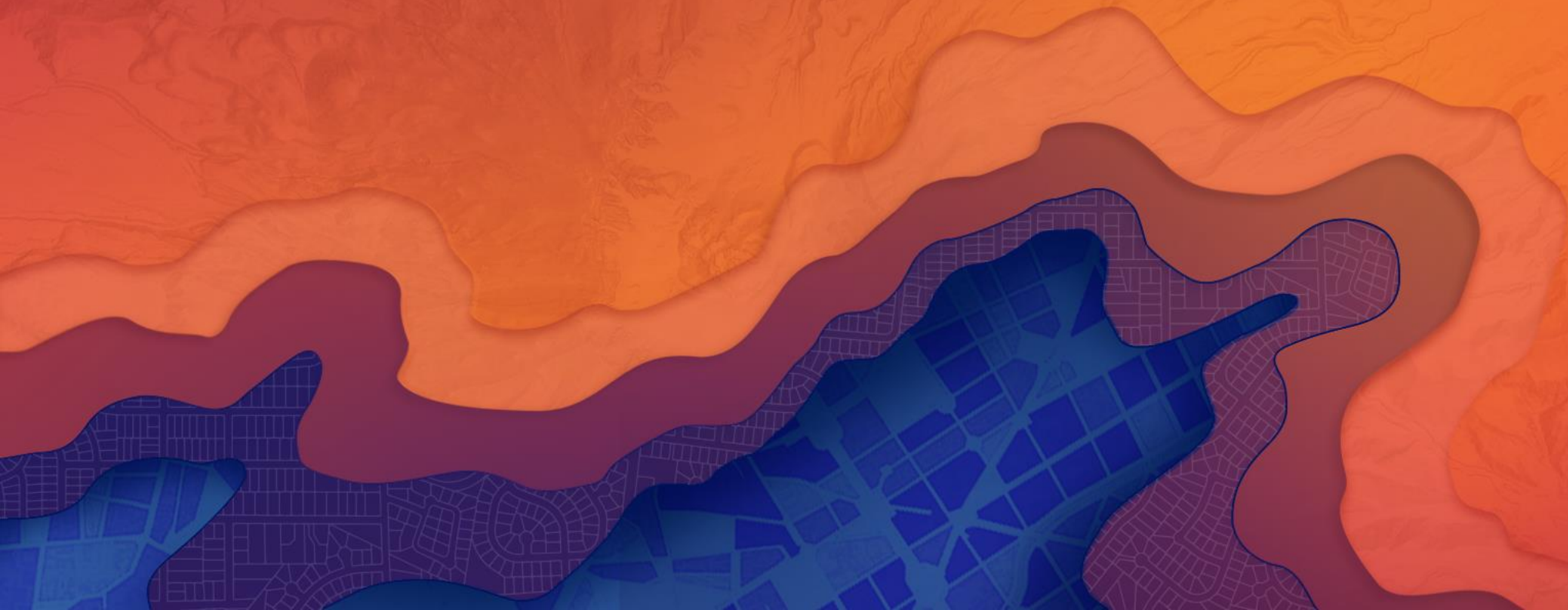
Watch out for the 'Gotchas'

Things to avoid

- Avoid long lists of acceptance criteria on a single user story
- Prepare for conflicting requirements
- Avoid requirements that are ambiguous
- Avoid requirements that describe HOW
- Requirements must have a “reason”
- Avoid moving forward on development until after the customer has reviewed the design
- Don't forget to prioritize



Manage Requirements



Requirement Management Tools

Licensed and Open Source

Compare

Waffle.io

Microsoft Team Foundation Server (TFS)

Developing Requirements | Work Item Explorer | View | Search | Results | 20 | Sort By

View Results | Refresh | Search | Open in Microsoft Office | Edit Query | Columns | Columns

Query Results (24 items found, 3 filtered, 1 filtered down, 1 currently selected). The query has been modified.

ID	System Path	Title	Requirement Type	Work Item	Priority	Assigned To	Status	Parent
1498	System/Document 1	A Selector should allow user to select a person's request for service via email.	Scenario	Requirement 1	Glen Berger	Pending		
1499	System/Document 1 & All 1	User has capability to add name and contact	Feature	Requirement 2	Glen Berger	Pending		
1500	System/Document 1 & All 1	System generates work order ID	Feature	Requirement 2	Glen Berger	Pending		
1501	System/Document 1 & All 1	System verifies email address	Feature	Requirement 2	Glen Berger	Pending		
1502	System/Document 1	A Selector should allow user to enter service type information	Scenario	Requirement 2	Glen Berger	Pending		
1503	System/Document 1 & All 2	Application presents child choices to user (for determining public info, such as...	Feature	Requirement 2	Glen Berger	Pending		
1504	System/Document 1	A Selector is expected to streamline process of how the public provides information...	Scenario	Requirement 2	Glen Berger	Pending		
1505	System/Document 1 & All 1							
1506	System/Document 1	A Selector d...						
1507	System/Document 1 & All 1	User can...						
1508	System/Document 1 & All 1	User can...						
1509	System/Document 1 & All 1	User can...						

JIRA

Displaying issues 1 to 11 of 11 matching issues

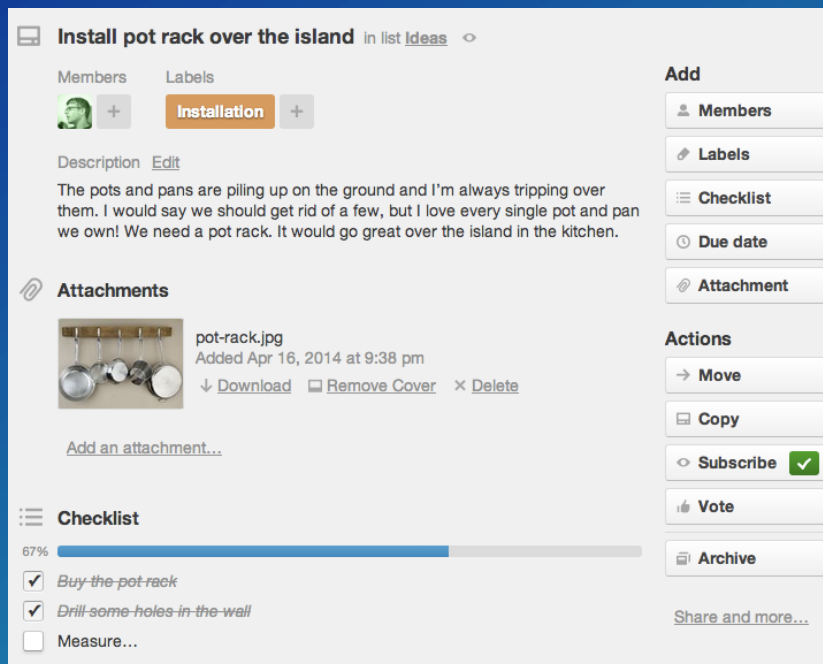
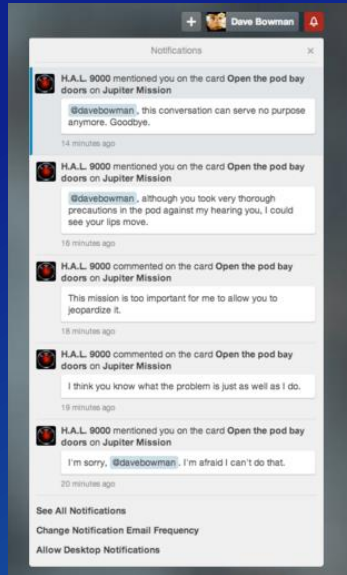
ID	Summary	Sub-Tasks	Assignee	P	Status	Resolution	Created
SYSA-6	Selection should allow anyone in public to submit a request for service via a web application	SYSA-7, SYSA-8, SYSA-9	Glen Berger	Open	Unresolved	0	
SYSA-7	SYSA-7 / User has capability to add name and contact		Glen Berger	Open	Unresolved	0	
SYSA-8	SYSA-8 / System generates work order ID		Glen Berger	Open	Unresolved	0	
SYSA-9	SYSA-9 / System verifies email address		Glen Berger	Open	Unresolved	0	
SYSA-10	Selection should allow user to enter service type information	SYSA-11	Glen Berger	Open	Unresolved	0	
SYSA-11	SYSA-11 / Application presents valid choices to user (for determining public info, such as...		Glen Berger	Open	Unresolved	0	
SYSA-12	Selection is expected to streamline process of how the public provides information	SYSA-13	Glen Berger	Open	Unresolved	0	
SYSA-13	SYSA-13 / If returning user, then system populates email address or name based on field entry		Glen Berger	Open	Unresolved	0	07/16/12 07/16/12 08/07/12
SYSA-14	Selection should not require GIS expertise	SYSA-15, SYSA-16, SYSA-17	Glen Berger	Open	Unresolved	0	07/16/12 07/16/12 05/07/12
SYSA-15	SYSA-15 / User can enter information		Glen Berger	In Progress	Unresolved	0	07/16/12 07/16/12
SYSA-17	SYSA-17 / User can select on a map		Glen Berger	Open	Unresolved	0	07/16/12 07/16/12

Displaying issues 1 to 11 of 11 matching issues

waffle.io security

Backlog	Ready	In Progress	Done
24 data identification, analysis, and analytics [waffle.io]	25 data identification, analysis, and analytics [waffle.io]	3 data identification, analysis, and analytics [waffle.io]	22 data identification, analysis, and analytics [waffle.io]
22 data identification, analysis, and analytics [waffle.io]	23 data identification, analysis, and analytics [waffle.io]	4 data identification, analysis, and analytics [waffle.io]	5 data identification, analysis, and analytics [waffle.io]
21 data identification, analysis, and analytics [waffle.io]	24 data identification, analysis, and analytics [waffle.io]	5 data identification, analysis, and analytics [waffle.io]	6 data identification, analysis, and analytics [waffle.io]
20 data identification, analysis, and analytics [waffle.io]	25 data identification, analysis, and analytics [waffle.io]	6 data identification, analysis, and analytics [waffle.io]	7 data identification, analysis, and analytics [waffle.io]
19 data identification, analysis, and analytics [waffle.io]	26 data identification, analysis, and analytics [waffle.io]	7 data identification, analysis, and analytics [waffle.io]	8 data identification, analysis, and analytics [waffle.io]
18 data identification, analysis, and analytics [waffle.io]	27 data identification, analysis, and analytics [waffle.io]	8 data identification, analysis, and analytics [waffle.io]	9 data identification, analysis, and analytics [waffle.io]
17 data identification, analysis, and analytics [waffle.io]	28 data identification, analysis, and analytics [waffle.io]	9 data identification, analysis, and analytics [waffle.io]	10 data identification, analysis, and analytics [waffle.io]
16 data identification, analysis, and analytics [waffle.io]	29 data identification, analysis, and analytics [waffle.io]	10 data identification, analysis, and analytics [waffle.io]	11 data identification, analysis, and analytics [waffle.io]
15 data identification, analysis, and analytics [waffle.io]	30 data identification, analysis, and analytics [waffle.io]	11 data identification, analysis, and analytics [waffle.io]	12 data identification, analysis, and analytics [waffle.io]
14 data identification, analysis, and analytics [waffle.io]	31 data identification, analysis, and analytics [waffle.io]	12 data identification, analysis, and analytics [waffle.io]	13 data identification, analysis, and analytics [waffle.io]
13 data identification, analysis, and analytics [waffle.io]	32 data identification, analysis, and analytics [waffle.io]	13 data identification, analysis, and analytics [waffle.io]	14 data identification, analysis, and analytics [waffle.io]
12 data identification, analysis, and analytics [waffle.io]	33 data identification, analysis, and analytics [waffle.io]	14 data identification, analysis, and analytics [waffle.io]	15 data identification, analysis, and analytics [waffle.io]
11 data identification, analysis, and analytics [waffle.io]	34 data identification, analysis, and analytics [waffle.io]	15 data identification, analysis, and analytics [waffle.io]	16 data identification, analysis, and analytics [waffle.io]
10 data identification, analysis, and analytics [waffle.io]	35 data identification, analysis, and analytics [waffle.io]	16 data identification, analysis, and analytics [waffle.io]	17 data identification, analysis, and analytics [waffle.io]
9 data identification, analysis, and analytics [waffle.io]	36 data identification, analysis, and analytics [waffle.io]	17 data identification, analysis, and analytics [waffle.io]	18 data identification, analysis, and analytics [waffle.io]
8 data identification, analysis, and analytics [waffle.io]	37 data identification, analysis, and analytics [waffle.io]	18 data identification, analysis, and analytics [waffle.io]	19 data identification, analysis, and analytics [waffle.io]
7 data identification, analysis, and analytics [waffle.io]	38 data identification, analysis, and analytics [waffle.io]	19 data identification, analysis, and analytics [waffle.io]	20 data identification, analysis, and analytics [waffle.io]
6 data identification, analysis, and analytics [waffle.io]	39 data identification, analysis, and analytics [waffle.io]	20 data identification, analysis, and analytics [waffle.io]	21 data identification, analysis, and analytics [waffle.io]
5 data identification, analysis, and analytics [waffle.io]	40 data identification, analysis, and analytics [waffle.io]	21 data identification, analysis, and analytics [waffle.io]	22 data identification, analysis, and analytics [waffle.io]
4 data identification, analysis, and analytics [waffle.io]	41 data identification, analysis, and analytics [waffle.io]	22 data identification, analysis, and analytics [waffle.io]	23 data identification, analysis, and analytics [waffle.io]
3 data identification, analysis, and analytics [waffle.io]	42 data identification, analysis, and analytics [waffle.io]	23 data identification, analysis, and analytics [waffle.io]	24 data identification, analysis, and analytics [waffle.io]
2 data identification, analysis, and analytics [waffle.io]	43 data identification, analysis, and analytics [waffle.io]	24 data identification, analysis, and analytics [waffle.io]	25 data identification, analysis, and analytics [waffle.io]
1 data identification, analysis, and analytics [waffle.io]	44 data identification, analysis, and analytics [waffle.io]	25 data identification, analysis, and analytics [waffle.io]	26 data identification, analysis, and analytics [waffle.io]

Using Trello



Using GitHub

Code Issues 176 Pull requests 0 Wiki Pulse Graphs

Filters is:issue is:open Labels Milestones New issue

176 Open 1,244 Closed Author Labels Milestones Assignee Sort

- New pub for Survey123** 2 - In Progress A - Doc-Dev Priority=High
#3355 opened 14 hours ago by marikavertzonis 2016-Upd 3 (April 20...
- Question: Best version to be linking to from non-desktop help** SubGrp=Apps
#3348 opened 5 days ago by kylliedonia
- Localization: Workforce initial release help** 0 - Backlog A - L10n Area=L10n SubGrp=Apps
#3345 opened 5 days ago by kylliedonia
- Localization: Workforce initial release home** 0 - Backlog A - L10n Area=L10n SubGrp=Apps
#3344 opened 5 days ago by kylliedonia
- Incorrect appearance of table in AppStudio doc** 1 - Planned A - Author Priority=Moderate
#3339 opened 6 days ago by marikavertzonis 2016-Upd 3 (April 20...

https://waffle.io/ArcGIS/BayerCropScience

ArcGIS/BayerCropScience Add Issue

gavinr updated #960.

Backlog 106 528	Sprint Backlog 30 244	In Progress 11 37	Needs Test 2 1
873 Create "Notifications list" page (20) 3	919 Production Build 1.7 1.8 3 1	978 882 develop 2 1	955 Change "Home" button to "Map View" 1.7
965 Spatial Query Feature: Download/Export 1	740 Clarify Protocol Status & Job Status widgets (dev task) 1.8 3 1	971 Remove the halo effect on the text symbol 1	916 Number of notifications does not change upon deleting a notification 1.8 bug
828 DB - Enable tracking of units for data layer attributes 4	899 Author cannot make edits to protocol that they copied 1.8 bug 5 2	966 832 save confirm modal 1	
977 Protocol Report - Grayscale Version UI/UX Help 5 1	889 Transparency slider will not change back to 0% 1.8 bug 3 5	905 AgXPOC 1	
842 Confirm SST agX data ingest for a job step - wireframe 1	970 Protocol Report Modal 1.8 5	900 843 develop 1	
		843 SST data loader 3	

ArcGIS / arcgis-doc-website PRIVATE

Code Issues 176 Pull requests 0 Wiki Pulse Graphs

Home

Marika Vertzonis edited this page 21 days ago · 88 revisions

This wiki is about the <http://doc.arcgis.com/>... sub-domain. It includes info on how content on this sub-domain is produced and edited.

What content goes on doc.arcgis.com?

- Home pages and help systems for the [ArcGIS Online](#) platform & its connected apps and data, etc. These pages are presented in the same UI as ArcGIS.com.

Note: The links below go to the content under development, not the current released version.

- AppStudio for ArcGIS
- ArcGIS.com Help
- ArcGIS for Smartphones & Tablets
- BAO
- Collector for ArcGIS
- Community Analyst
- Community Maps

Using TFS

Backlog items to Features

Backlog Board Mapping Off In progress items Show View Backlog items to Features

Title	State	Effort	Tags
Acquisition and core workflow	In Progress		
Add, Edit, Remove from shopping cart	Approved	5	Mobile
Edit existing users	Committed	5	Web
Direct link to an item in the catalog	Committed	8	Mobile
Welcome mails that include a "Getting Started" v...	New	3	Mobile

Title	State	Remaining Work	Work By: Assigned To
Editing items already added to the cart	Done	9	Christina Kelly (8 of 14 h)
Cancelling a submitted order	Committed	22	Lowell Steel (17 of 14 h)
Notification to the user	To Do	6	Noah Munger (6 of 7 h)
Design work on the cancel dialog	To Do	4	
Credit card refund	To Do	4	
Order history updated styling	To Do	4	
End-to-end testing	To Do	2	
New route to view a cancelled order	To Do	2	

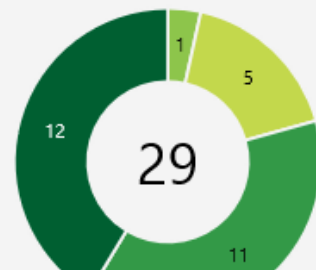
Tasks Needing Attention

To Do In Progress



Backlog Distribution

Committed Approved New Done






























Type of query Flat list of work items Work items and direct links Tree of work items

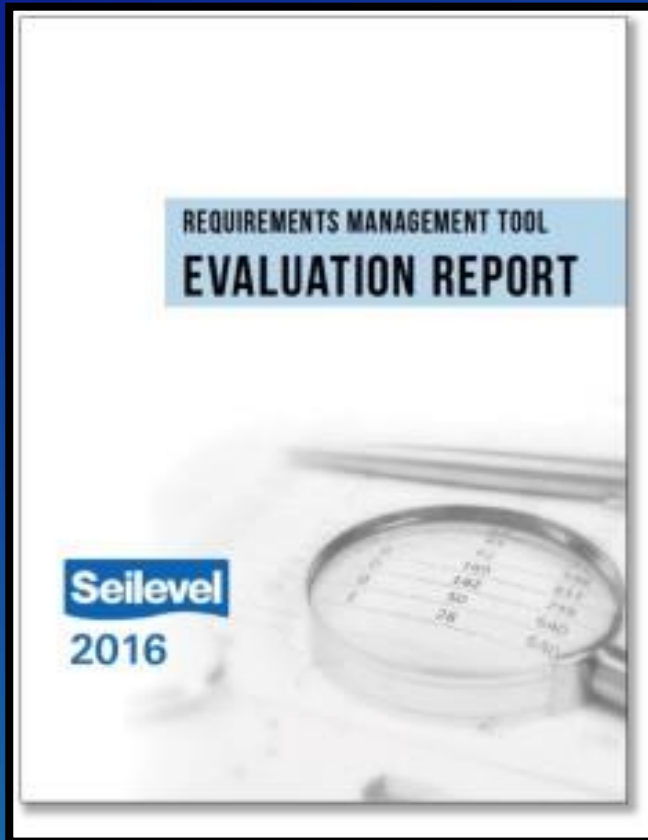
	And/Or	Field	Operator	Value
+ X	<input type="checkbox"/>	Team Project	=	@Project
+ X	<input type="checkbox"/> And	Assigned To	=	Christina Kelly
+ X	<input type="checkbox"/> And	Work Item Type	x =	Task
+ Add new clause				
Backlog Priority				
Blocked				
Business Value				
Called By				

Save query

Making a Decision

Project Considerations	Trello	GitHub	TFS
Requirements are Proprietary			
Mobile App			
Easy to setup			
Estimation tools			
Scheduling tools			
Automated Burndown chart			
Easily integrated with Visual Studio for Code Repository			
Capacity Planning			
Exports to MPP and Excel			

There is a lot of info out there to help



PROJECT MANAGEMENT ZONE

	JIRA X	Pivotal Tracker X	Team Foundation Server ⓧ	Trello X
	Bug tracking and project planning tool, available as cloud service and as commercial tool.	Pivotal Tracker is a web-based, lightweight, agile project management tool for software teams.	The Team Foundation Server is a source code management system also offering project management features as part of Microsoft's application lifecycle management solutions. More project management features are accessible via synchronization with Microsoft Project.	Trello is a web-based project management and collaboration tool based on Kanban-like lists.
Category	Project Planning, ranked #2 Issue Management, ranked #1	Project Planning, ranked #13	Project Planning, ranked #10	Project Planning, ranked #4 Project Collaboration, ranked #
Developer	Atlassian	Pivotal Labs	Microsoft	Trello ⓧ
Website	atlassian.com/software/jira	pivotaltracker.com	visualstudio.com/tfs	trello.com
Technical documentation	confluence.atlassian.com/jira/jira-documentation-1556.html	pivotaltracker.com/help	visualstudio.com/en-us/docs/-devops-alm-overview	help.trello.com
Social network pages	LinkedIn 17,123 followers Twitter 23,706 followers	Facebook 19,429 likes Google+ 1,492 followers LinkedIn 152 followers Twitter 10,741 followers	Facebook 2,228 likes LinkedIn 666 followers	Facebook 85,396 likes Google+ 33,717 followers LinkedIn 11,440 followers Twitter 146,027 followers

<http://project-management.zone/system/jira,pivotal-tracker,team-foundation-server,trello>

<http://assets.cdnma.com/13314/assets/WebsiteDownloads/2016-Seilevel-RequirementsTool-Evauation-Report-FINAL.pdf>

Free, open source fans?

A few years ago, Accompa put together a list, with pros and cons, of free requirements management tools



<http://rmblog.accompa.com/2012/04/free-open-source-requirements-management-tool/>

Requirements

THE most important part of a project

- **Solid requirements gathering leads to successful projects**
- **Consider solution, COTS capabilities before collecting additional requirements**
- **Involve the right people in the process**
- **Pick a methodology that fits your project**
- **Focus on the level of detail that is appropriate**
- **Important to prioritize and allocate**
- **Invest plenty of time to secure customer approval**

References

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www.agilemanifesto.org

<http://alistair.cockburn.us/>

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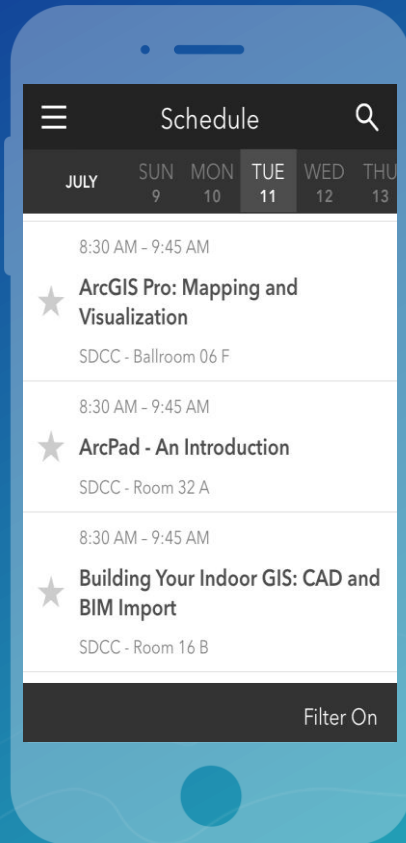
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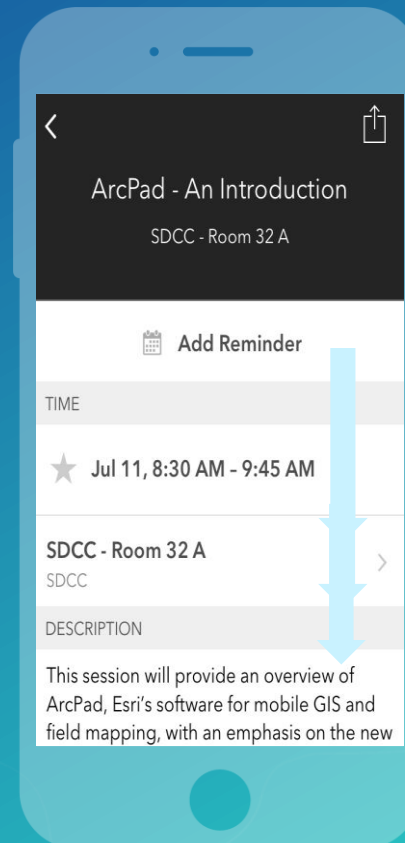
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