Monitoring Agile Projects

Matthew R. Kennedy, PhD
“emailmatthewkennedy@Gmail.com”

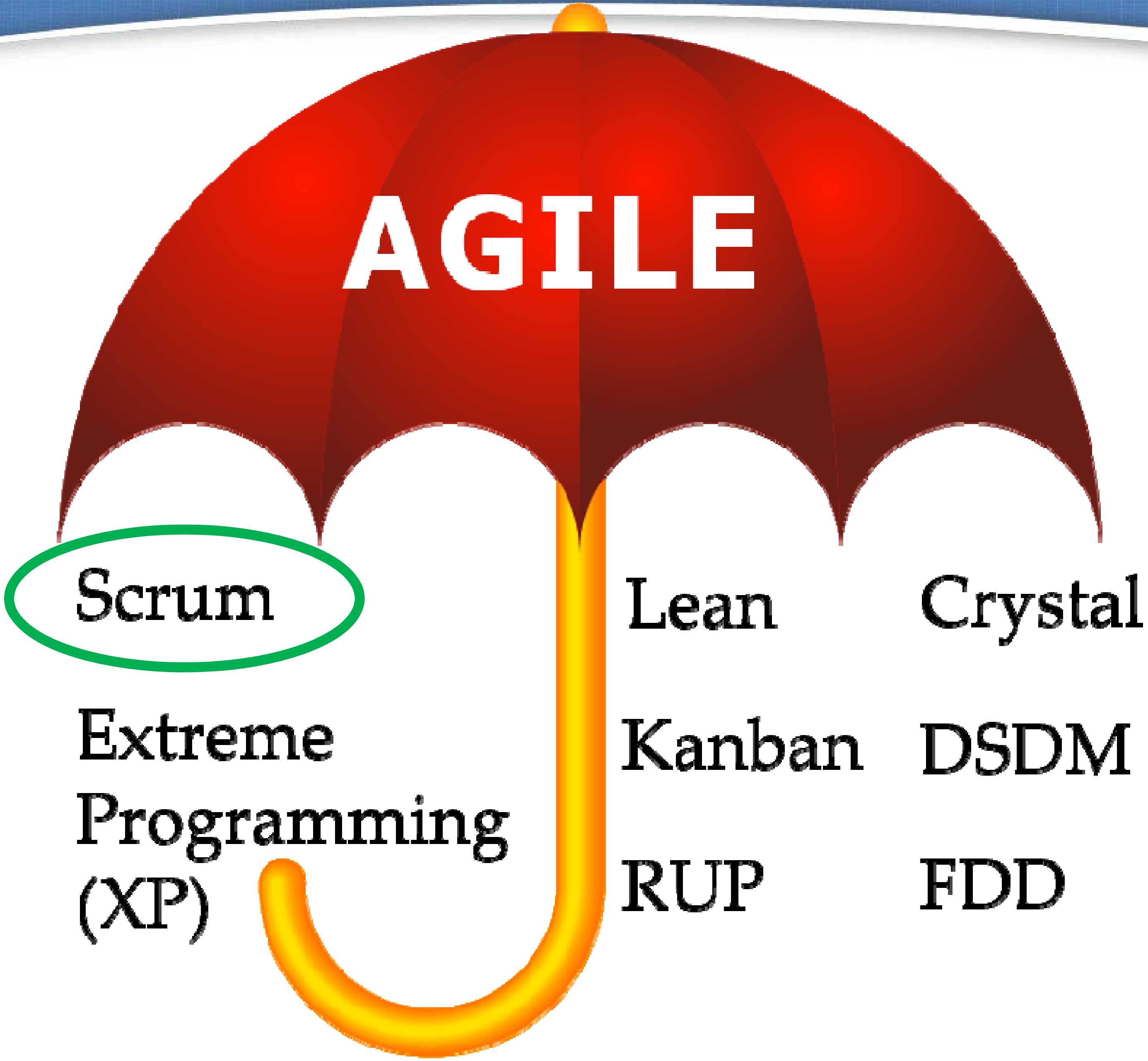
Overview

- What is Agile?
- Measurement Aspects
- 3 Steps to Measuring Agile Projects
  1. Assess your projects agile maturity
  2. Select the appropriate measures
  3. Modify and adapt frequently
- Example Project Measures

fppt.com

What is Agile?

fppt.com



AGILE

Scrum

Extreme Programming (XP)

Lean

Kanban

RUP

Crystal

DSDM

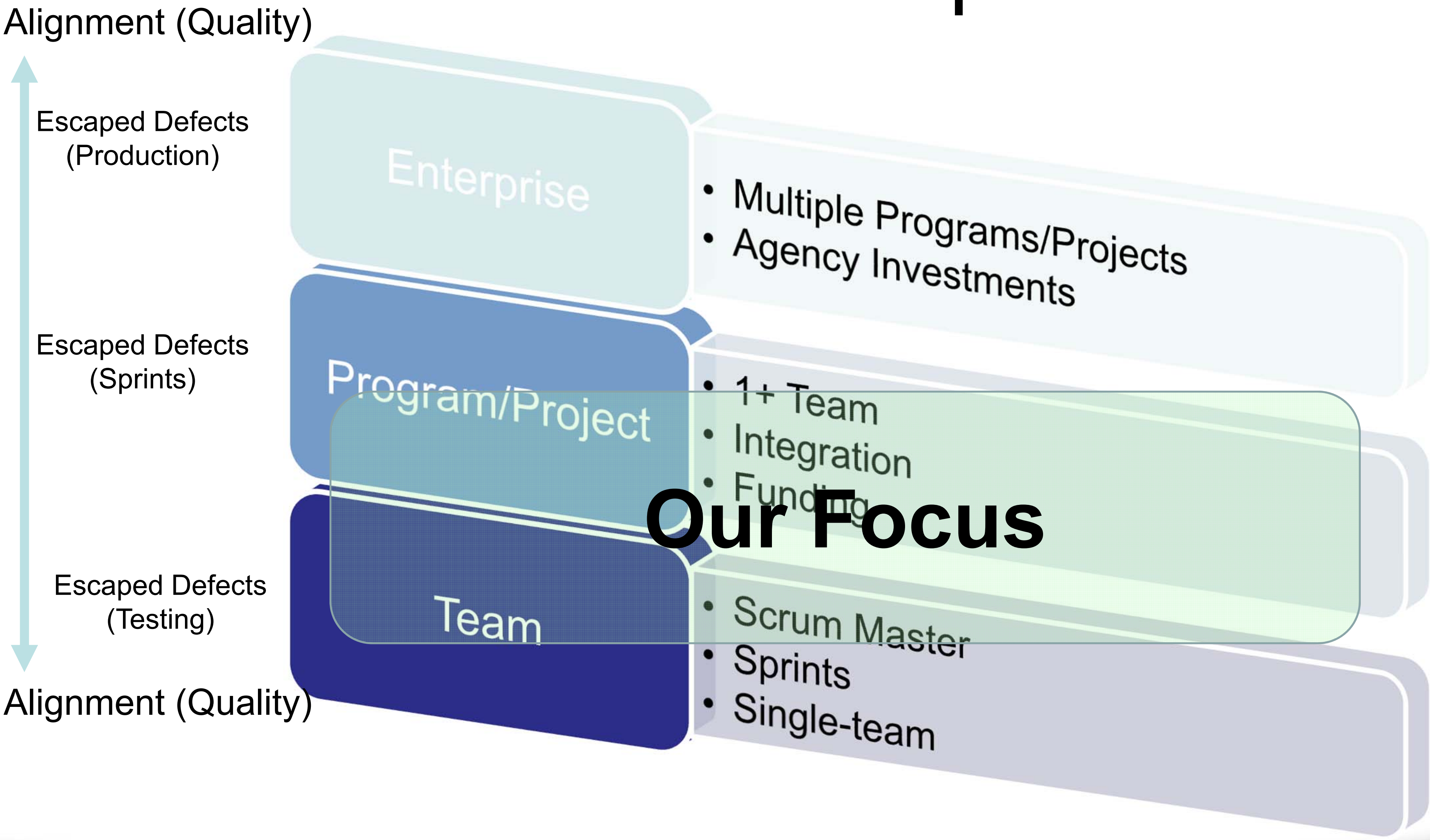
FDD

fppt.com

Measurement Aspects

fppt.com

Measurement Aspects



Alignment (Quality)

Escaped Defects (Production)

Escaped Defects (Sprints)

Escaped Defects (Testing)

Alignment (Quality)

Enterprise

- Multiple Programs/Projects
- Agency Investments

Program/Project

- 1+ Team
- Integration
- Funding

Team

- Scrum Master
- Sprints
- Single-team

Our Focus

Step 1: Assess your Projects Agile Maturity

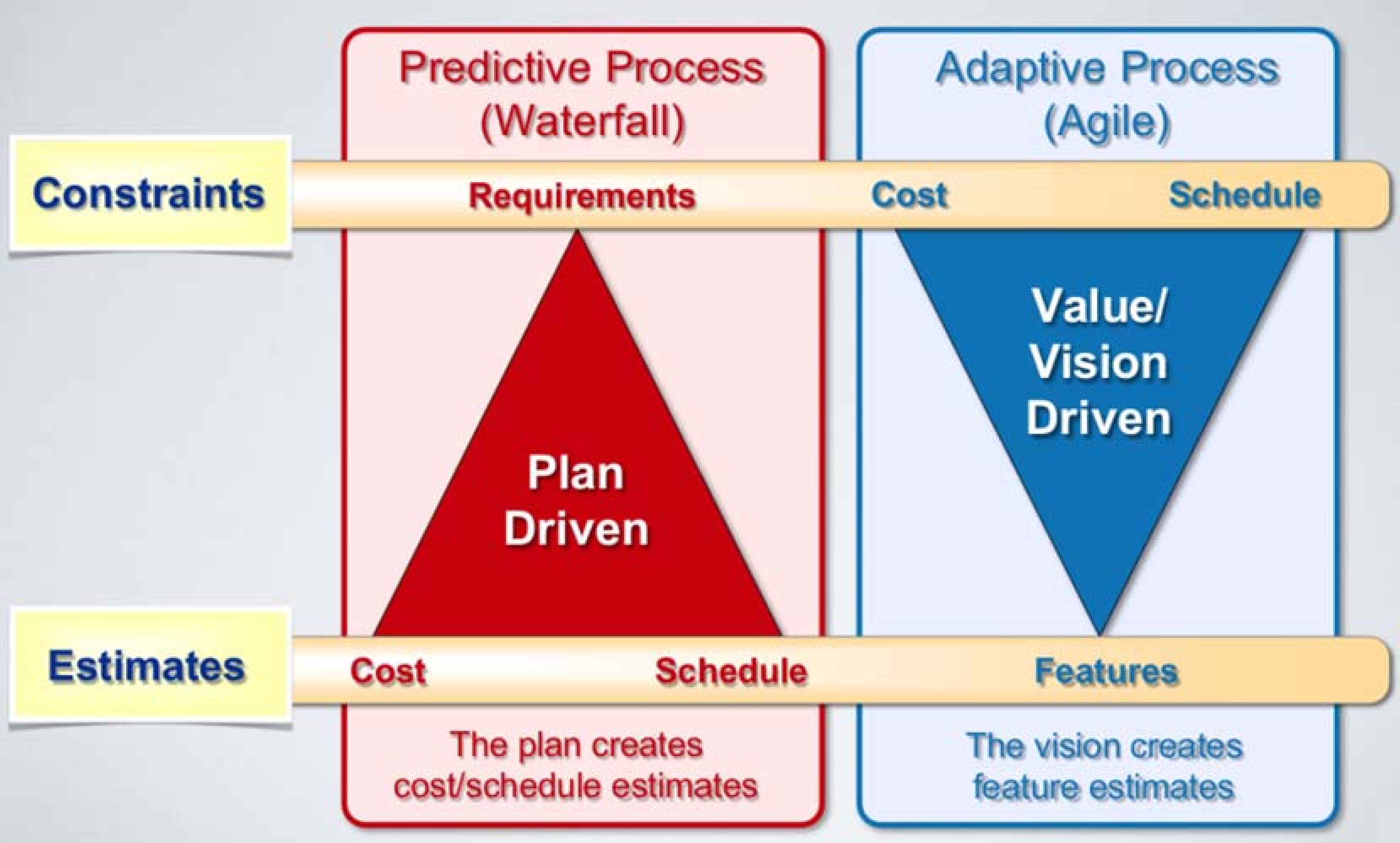
fppt.com

Plan-Driven vs. Vision/Evidence-Driven (Traditional vs. Agile)

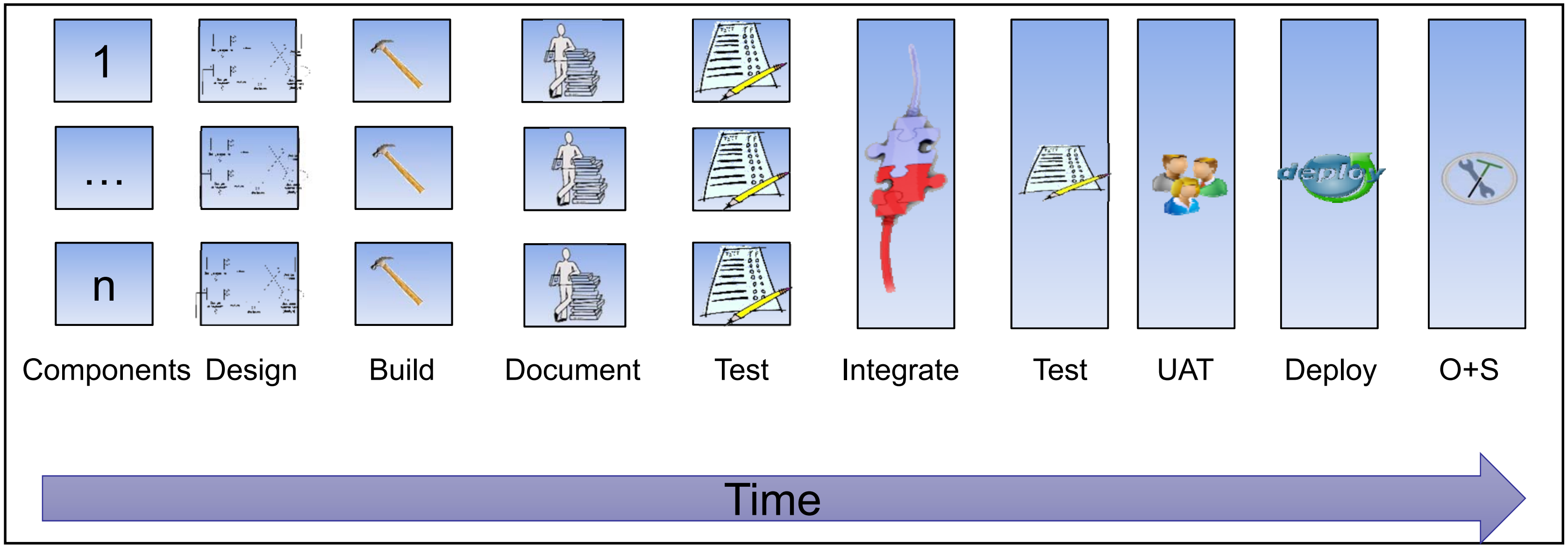
Traditional Project Management	Agile Project Management
Issues discovered later in the development lifecycle	Issues discovered earlier in development
Single Integration	Periodic / Continual Integration
Structured by Domain	Multidisciplinary Teams
Adds Time / Money to release to adapt to issues / requirements	Reduces functionality in release (pushed to another release) to adapt to issues / requirements
Tracks Progress by Stages	Tracks progress by Value (functionality complete)
‘Success’ is measured by conformance to a plan	‘Success’ is measured by delivering useful capabilities (Value)
Project Management Provides Estimates	Team Provides Estimates

fppt.com

Waterfall vs. Agile Project Management



“Traditional” Project Management



1

…

n

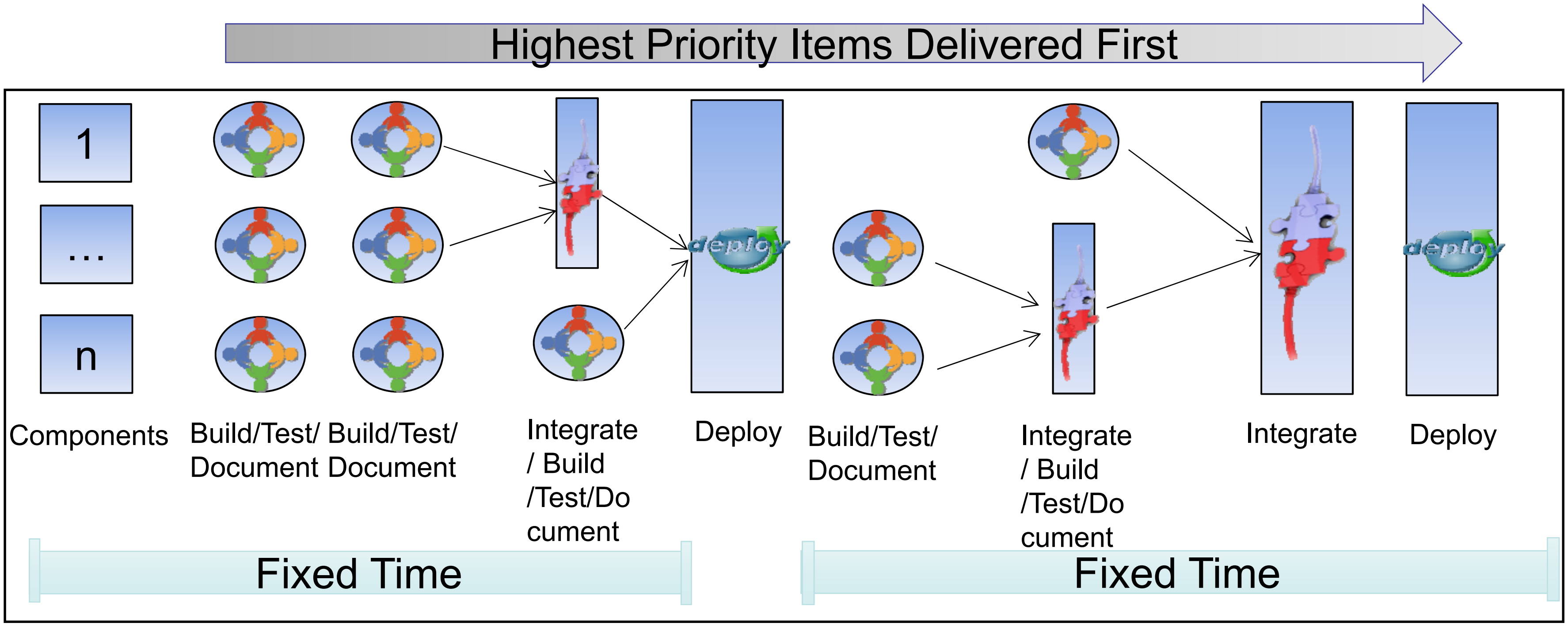
Components Design Build Document Test Integrate Test UAT Deploy O+S

Time

The average ACAT I development programs develop schedules for **five years**, lasting from Milestones B to C. (DSB, 2018)

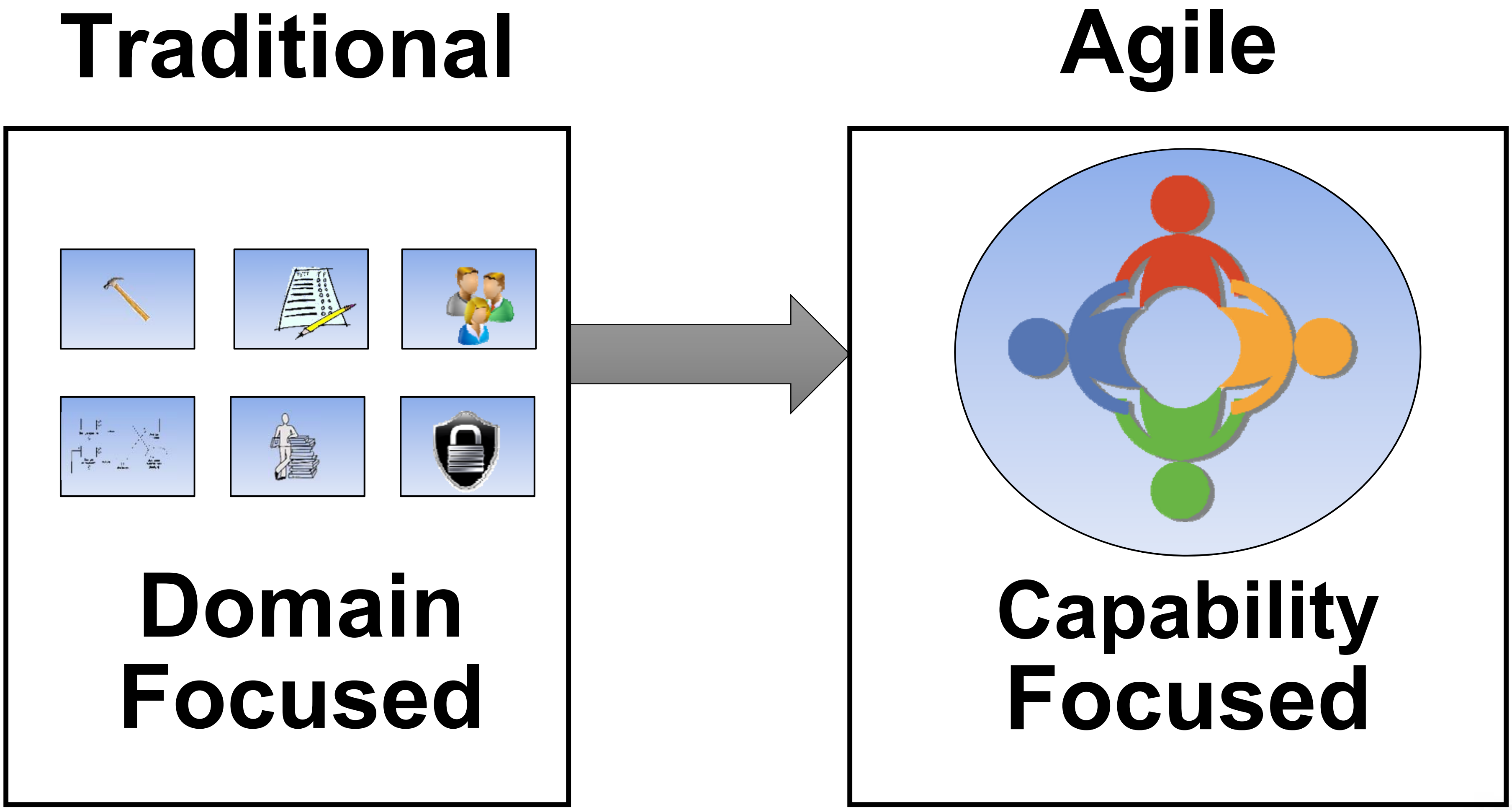
fppt.com

“Agile” Project Management



Amazon deploys to production every **11.6 second**

Agile Uses Multidisciplinary Teams



Traditional

Domain Focused

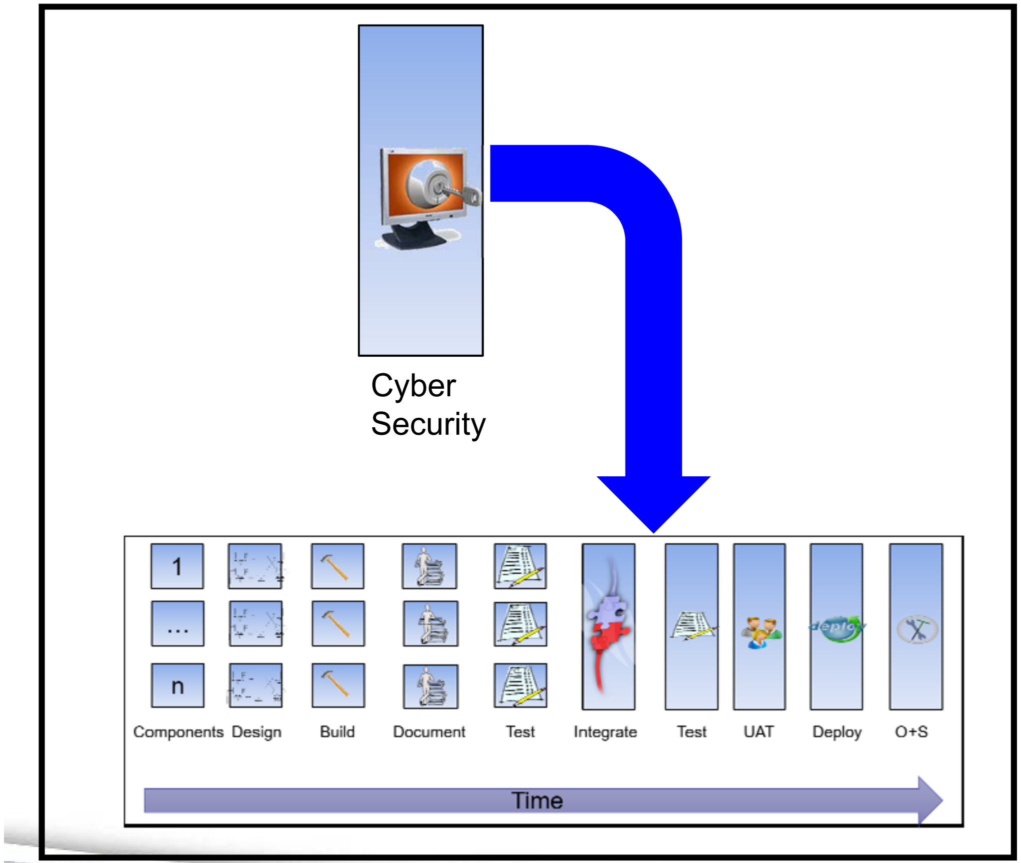
Agile

Capability Focused

fppt.com

Responding to a new “Domain”

Traditional



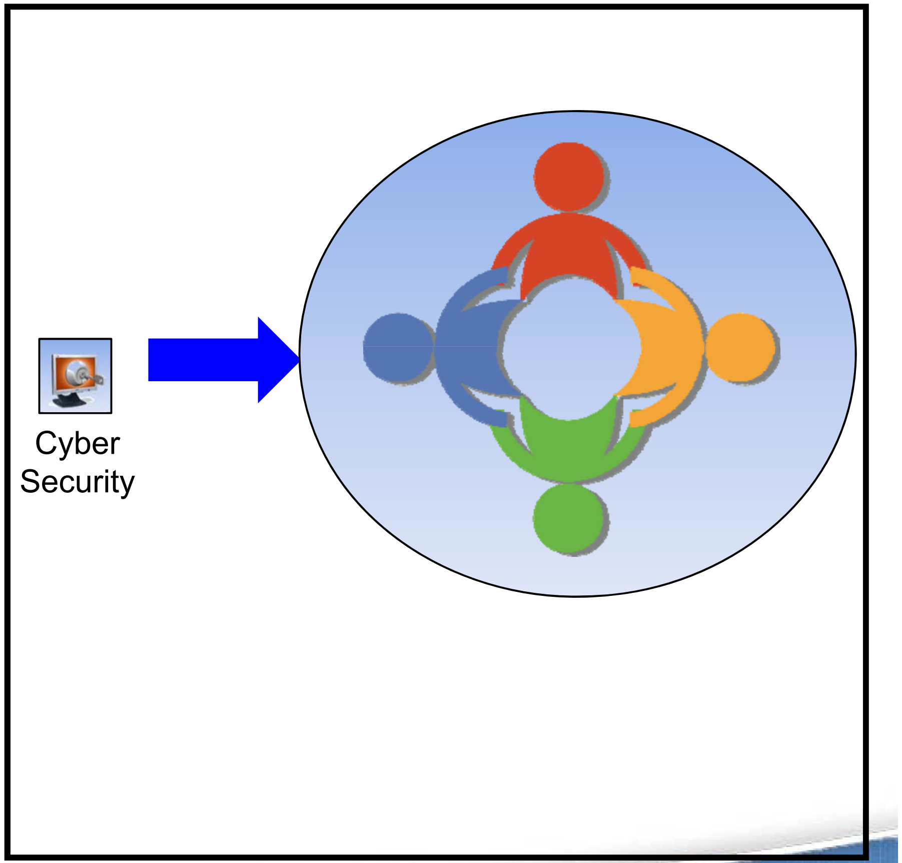
Cyber Security

1
…
n

Components Design Build Document Test Integrate Test UAT Deploy O+S

Time

Agile



Cyber Security

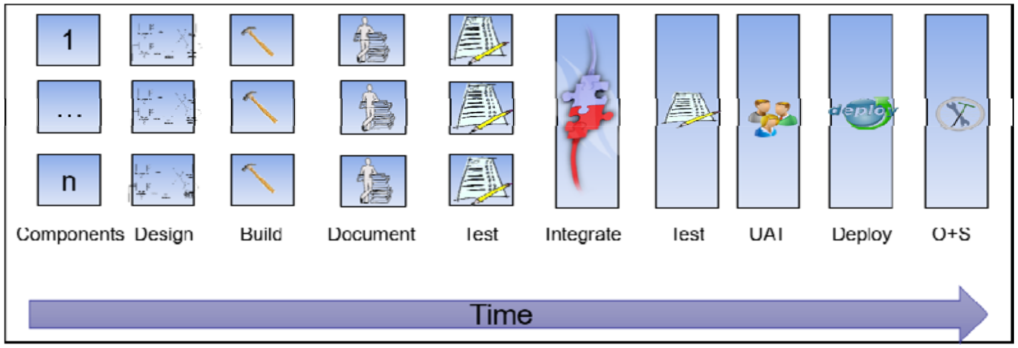
fppt.com

Similar Terminology*

- Iteration
- Increment
- Milestones
- Version Control
- Acceptance Testing
- Quality
- Schedule
- Integration
- Cost
- Risk

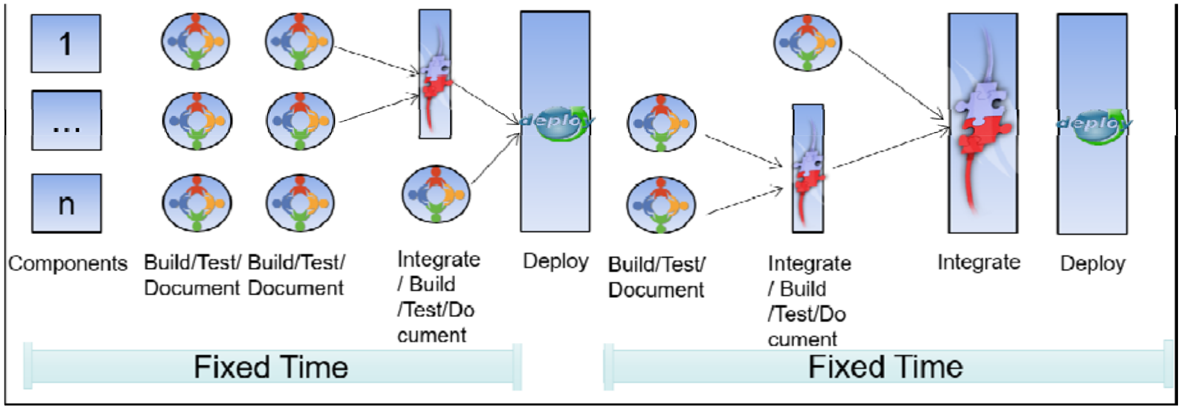
* Not a complete list

Terms Can Be Applied Differently



Where would we use “Milestones” in both models?

How confident are we in it’s accuracy in measuring our progress?



fppt.com

New Terminology

- Velocity
- User Story
- Sprint Burndown / Burnup chart
- Release Burndown / Burnup chart
- Epic
- Sprint
- Backlog

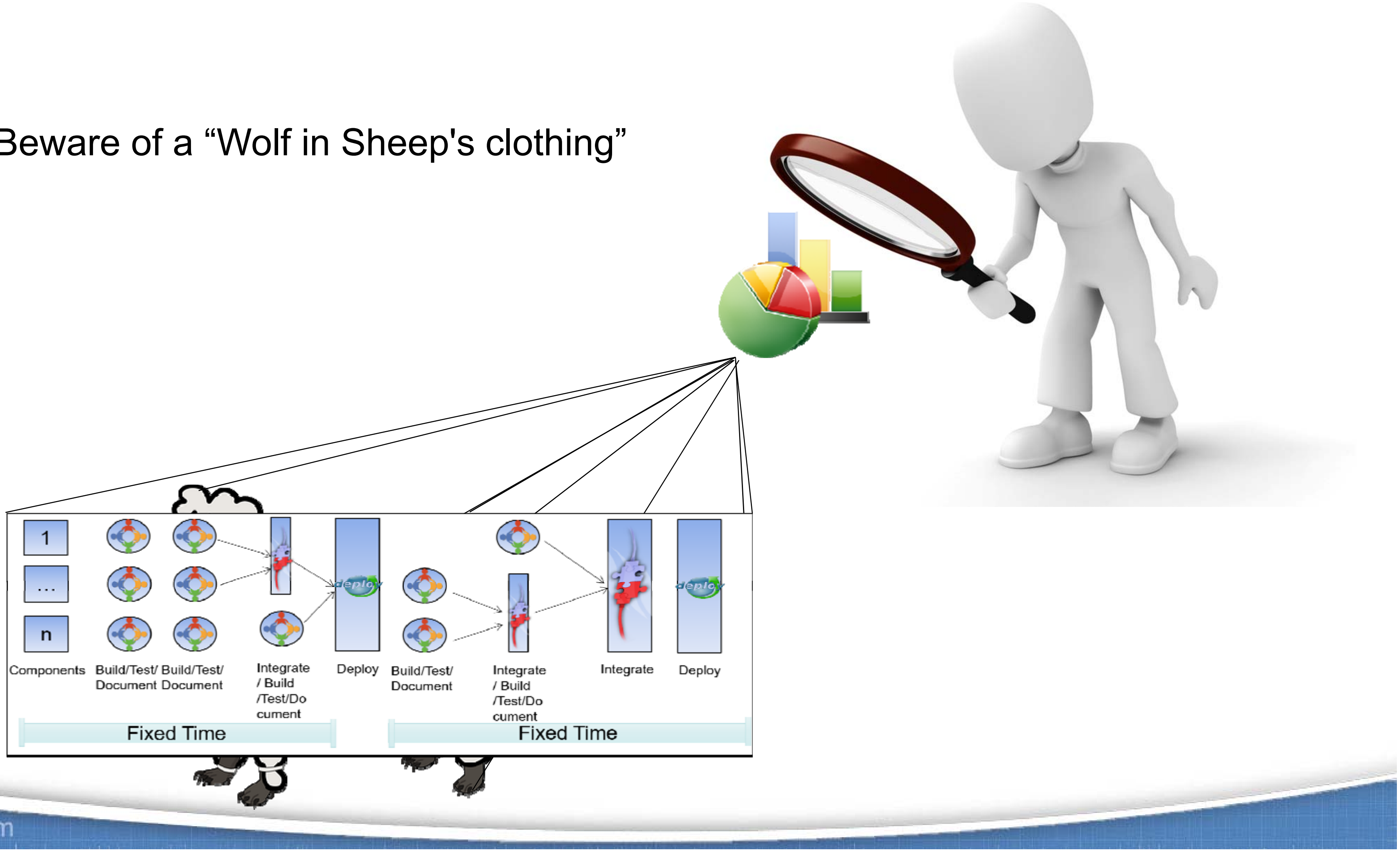
* Not a complete list

- Definition of Done (DoD)
- Acceptance Criteria
- Personas
- Scrum Master
- Sprint Planning
- Story mapping
- Backlog Grooming
- Daily Meeting

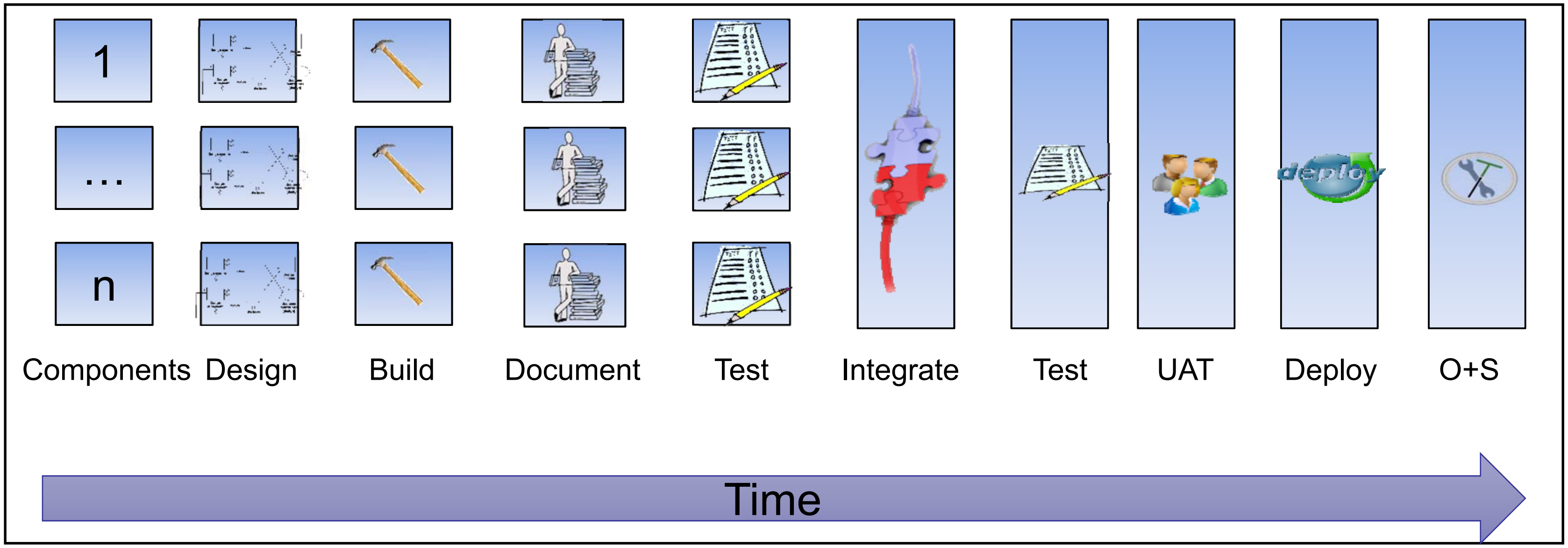
fppt.com

Measures are our “Eyes” into the Process

Beware of a “Wolf in Sheep's clothing”

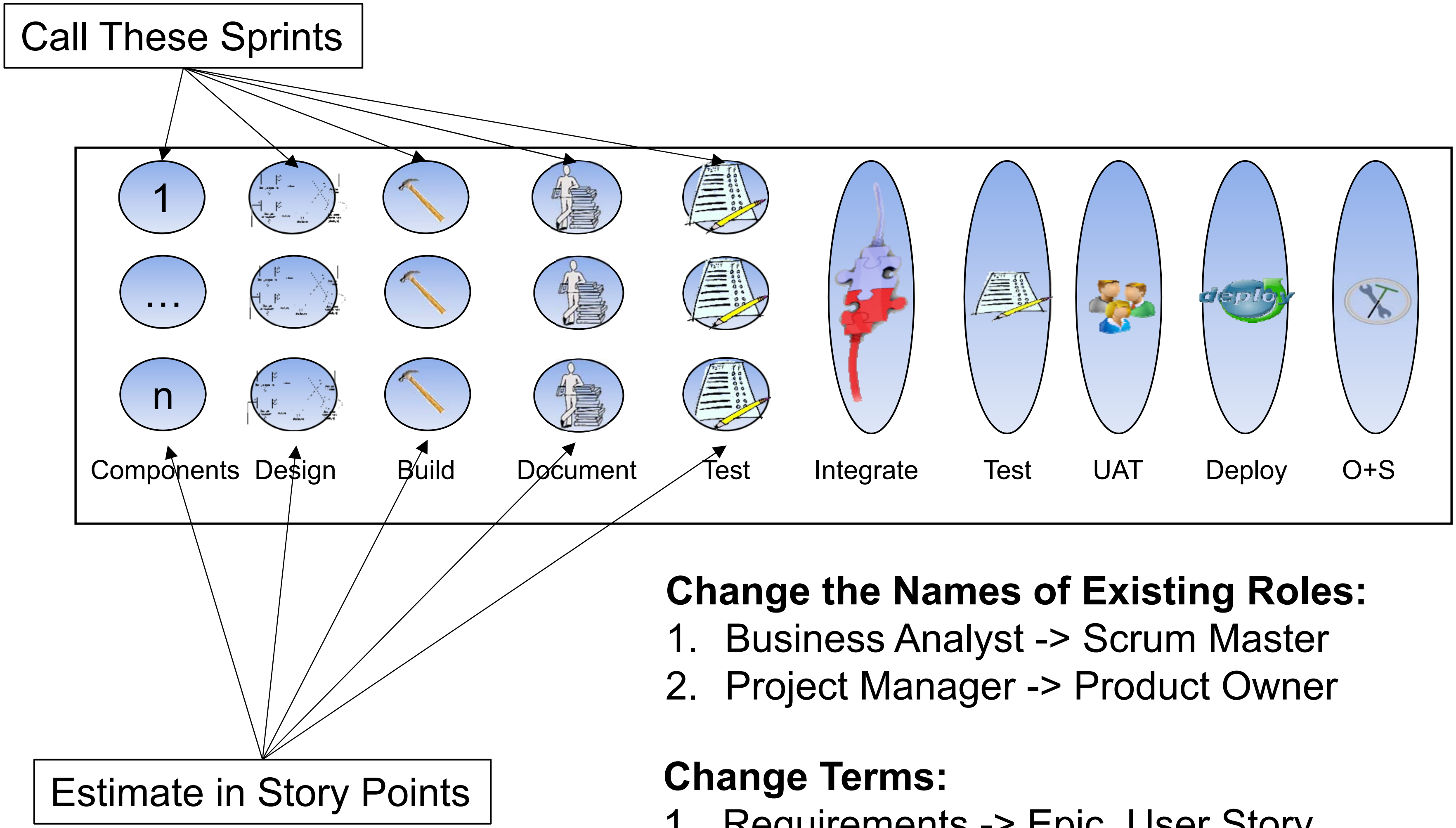


“FrAgile” Project Management



fppt.com

“FrAgile” Project Management



Call These Sprints

1

…

n

Components Design Build Document Test Integrate Test UAT Deploy O+S

Estimate in Story Points

Change the Names of Existing Roles:

1. Business Analyst -> Scrum Master
2. Project Manager -> Product Owner

Change Terms:

1. Requirements -> Epic, User Story

fppt.com

How do you Assess your Project

- Agile Maturity Models
- Periodic Inspection
  - – Agile Coach

fppt.com

Step 2: Select the Appropriate Measures

fppt.com

Measuring Agile Projects

- Similar Challenges
  - Finding the “right” thing to measure
  - Ensuring a measure is used for the “right” purpose
  - Unintended consequences

fppt.com

Finding the Right Measures

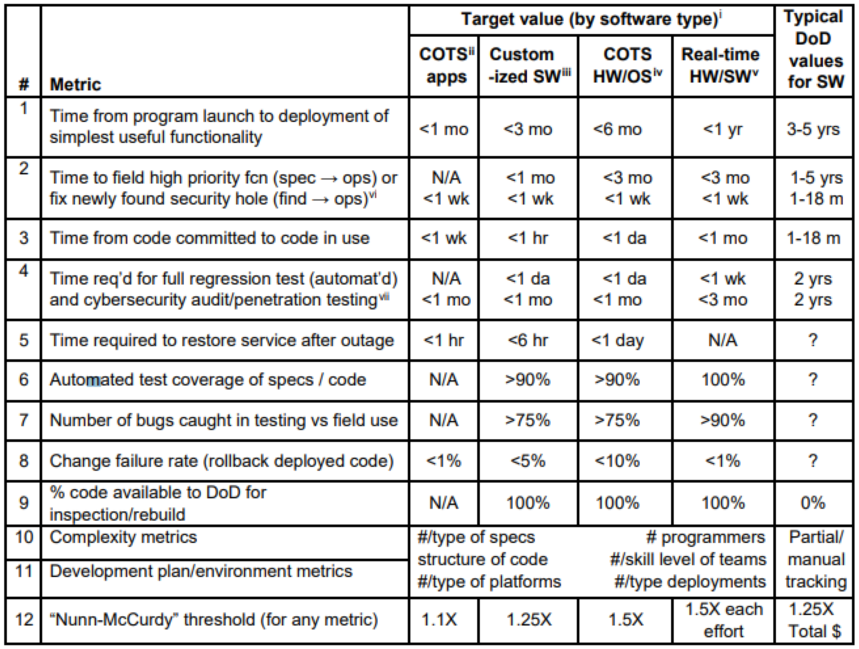
- Practical Software and Systems Measurement
- Goal-Question-Metric Approach
- Market Research

fppt.com

Finding the Right Measures (Example)

Sample Questions

1. Does it **currently** apply to our program?
2. Does it inform good decision making?
3. Can we get this information from a metric already being collected?
4. What aspect should it be tracked?
5. How are other aspects going to track this?
6. What is the cost of collection?
7. How can we collect it? Can it be automated?
8. …



#	Metric	Target value (by software type)[i]				Typical DoD values for SW
		COTS[ii] apps	Custom -ized SW[iii]	COTS HW/OS[iv]	Real-time HW/SW[v]	
1	Time from program launch to deployment of simplest useful functionality	<1 mo	<3 mo	<6 mo	<1 yr	3-5 yrs
2	Time to field high priority fcn (spec → ops) or fix newly found security hole (find → ops)[vi]	N/A <1 wk	<1 mo <1 wk	<3 mo <1 wk	<3 mo <1 wk	1-5 yrs 1-18 m
3	Time from code committed to code in use	<1 wk	<1 hr	<1 da	<1 mo	1-18 m
4	Time req'd for full regression test (automat'd) and cybersecurity audit/penetration testing[vii]	N/A <1 mo	<1 da <1 mo	<1 da <1 mo	<1 wk <3 mo	2 yrs 2 yrs
5	Time required to restore service after outage	<1 hr	<6 hr	<1 day	N/A	?
6	Automated test coverage of specs / code	N/A	>90%	>90%	100%	?
7	Number of bugs caught in testing vs field use	N/A	>75%	>75%	>90%	?
8	Change failure rate (rollback deployed code)	<1%	<5%	<10%	<1%	?
9	% code available to DoD for inspection/rebuild	N/A	100%	100%	100%	0%
10	Complexity metrics	#/type of specs structure of code #/type of platforms			# programmers #/skill level of teams #/type deployments	Partial/ manual tracking
11	Development plan/environment metrics					
12	"Nunn-McCurdy" threshold (for any metric)	1.1X	1.25X	1.5X	1.5X each effort	1.25X Total $

Defense Innovation Board Metrics for Software Development (July 2018)

fppt.com

Step 3: Modify and Adapt Frequently

fppt.com

Expect Change

- Agile delivers capability in small chunks allowing us to assess not only the quality of our system, but the quality of our metrics.

NOTHING IS PERMANENT
EXCEPT
CHANGE

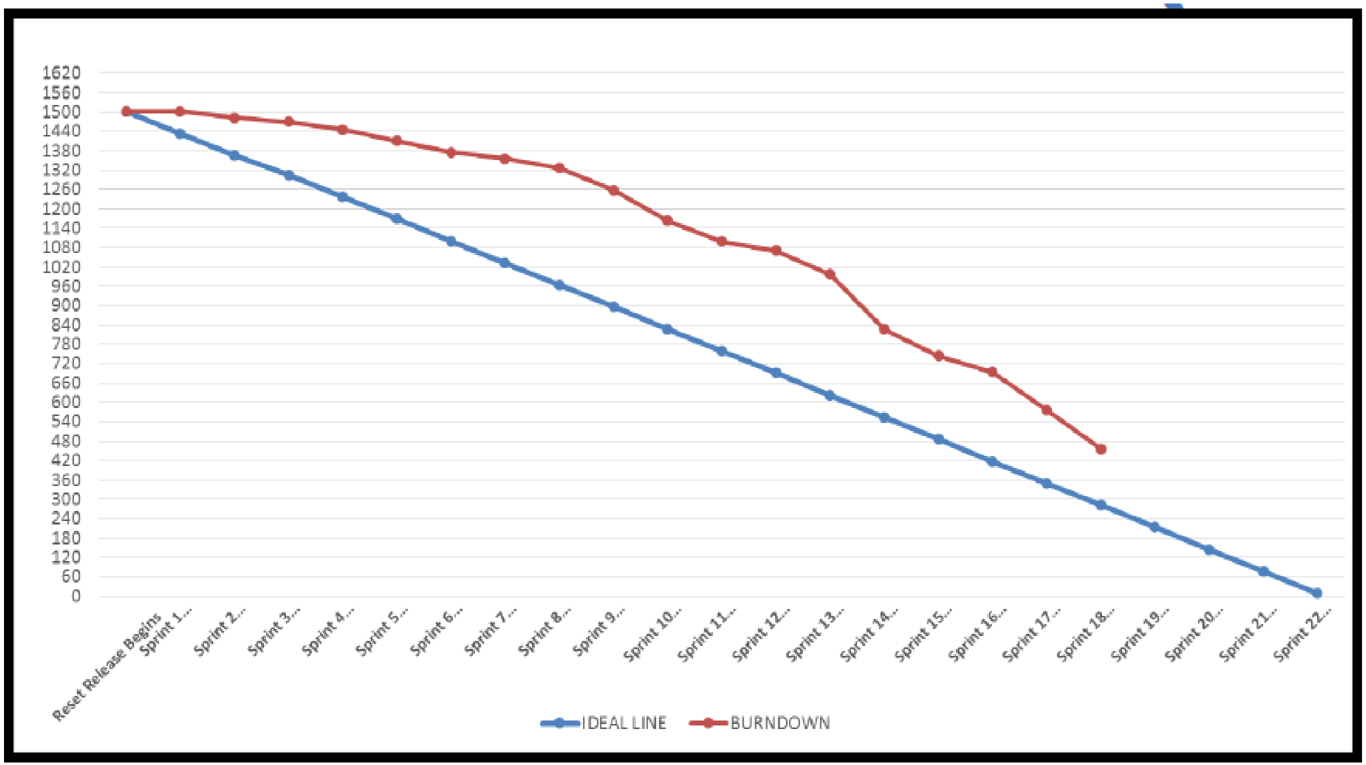
fppt.com

Example Project Measures

(At the Project Aspect)

fppt.com

Release Health



Sprint	SP Planned	SP Accepted	SP Remaining
17	118 SP	118 SP	497 SP
18	119 SP	119 SP	378 SP
19	108 SP	95	283
20	95	95	188
21	94	94	94
22	94	94	0

Release Summary

Release Date: XX/XX/XXXX
UAT Date: XX/XX/XXXX
UAT Date: XX/XX/XXXX

- Feature 1 (100)
- Feature 2 (75/60)
- Feature 3 (300/320)
- Feature 4 (450)
- Feature 5 (300) MVP
- Feature 6 (75) MVP
- Feature 7 (100)
- Feature 8 (100)

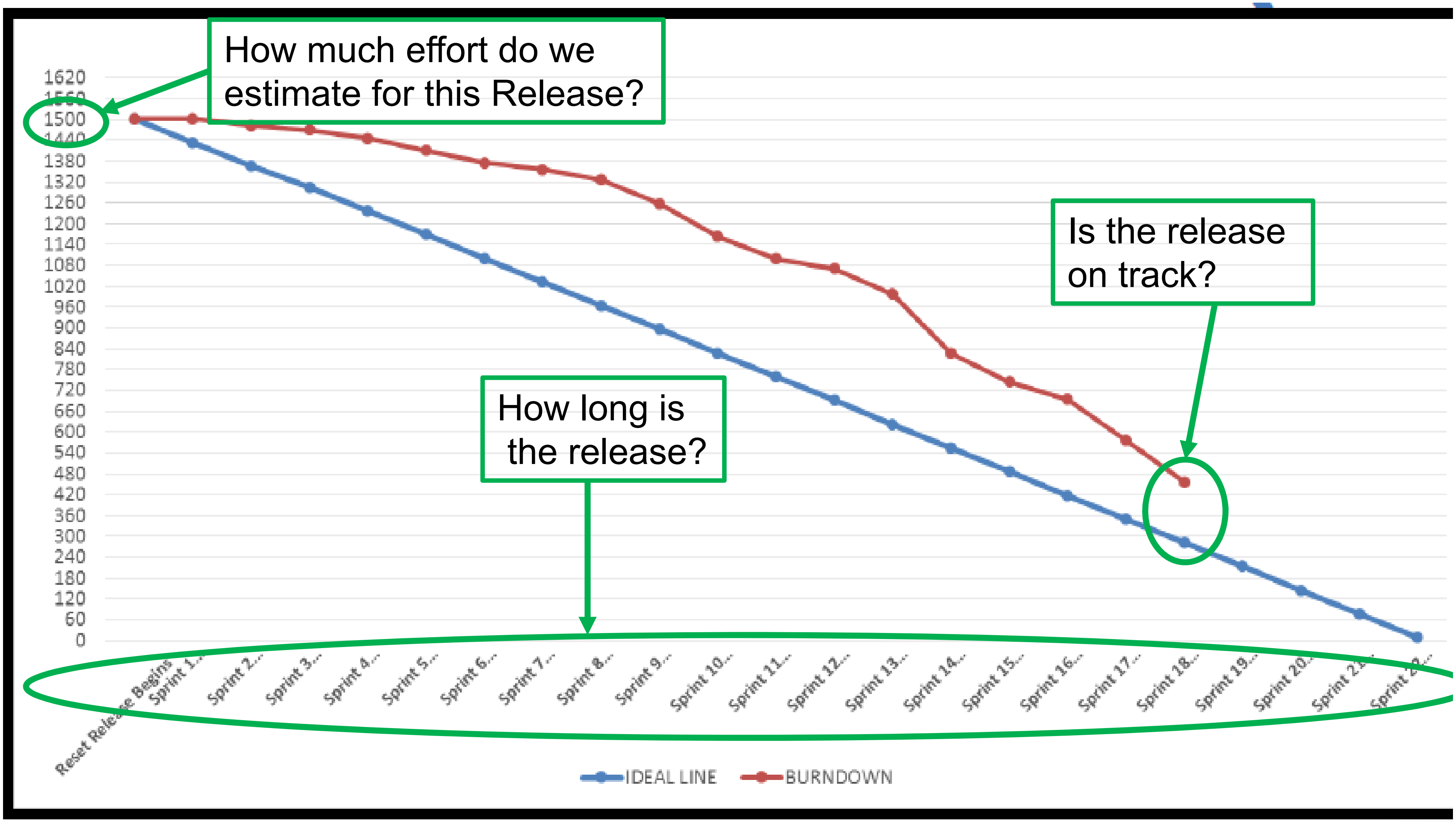
System Quality

Total Escaped Defects: 5
Remaining Defects: 5

Team Quality

Turnover Rate: 11%
Morale: ??

Release Burndown



How much effort do we estimate for this Release?

Is the release on track?

How long is the release?

fppt.com

Sprint Estimation

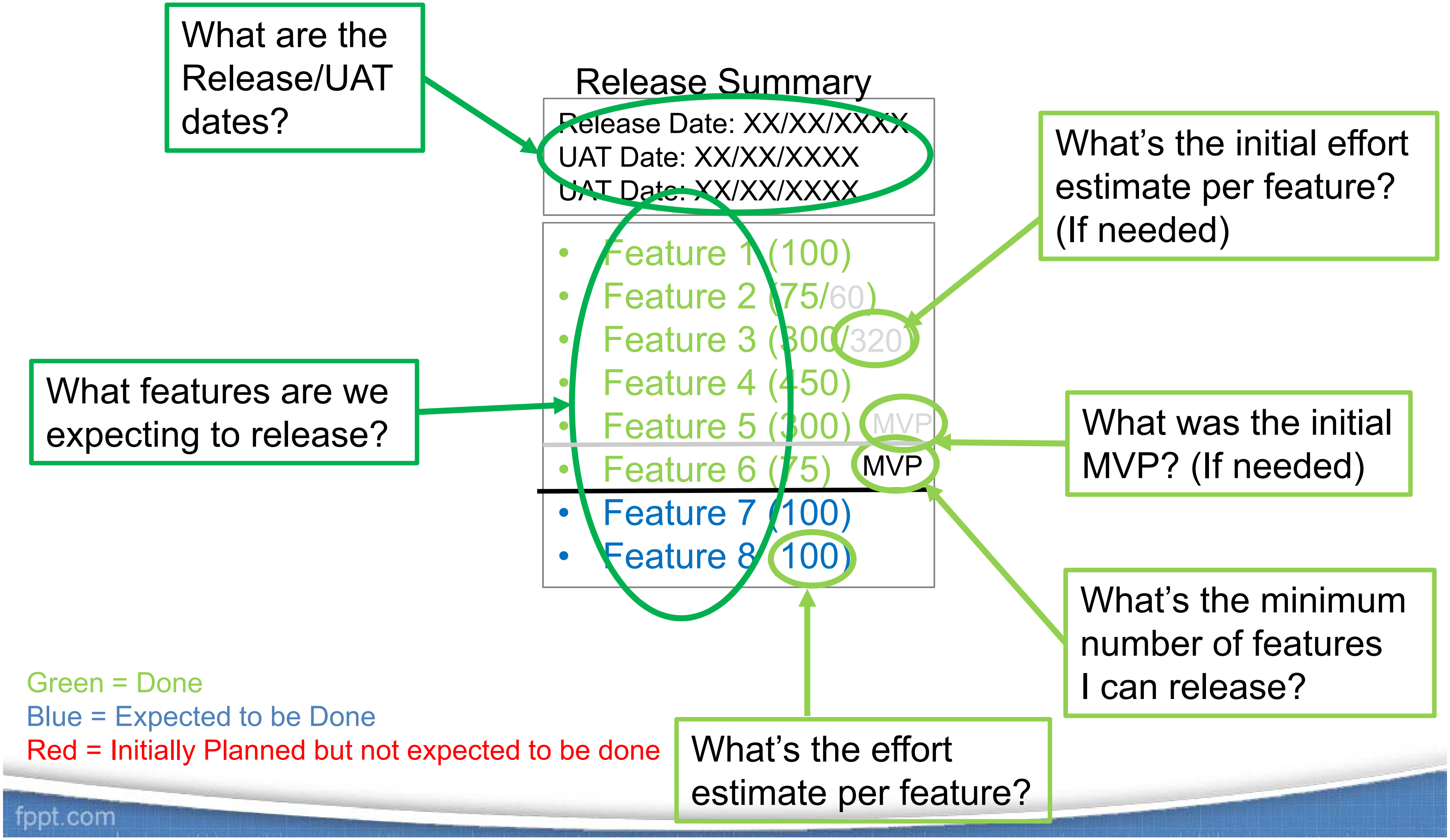
How accurate are the teams estimates?

Sprint	SP Planned	SP Accepted	SP Remaining
17	118 SP	118 SP	497 SP
18	119 SP	119 SP	378 SP
19	108 SP	95	283
20	95	95	188
21	94	94	94
22	94	94	0

How many story points are remaining?

fppt.com

Release Summary



What are the Release/UAT dates?

What features are we expecting to release?

Release Summary

Release Date: XX/XX/XXXX
UAT Date: XX/XX/XXXX
UAT Date: XX/XX/XXXX

- Feature 1 (100)
- Feature 2 (75/60)
- Feature 3 (300/320)
- Feature 4 (450)
- Feature 5 (300) MVP
- Feature 6 (75) MVP
- Feature 7 (100)
- Feature 8 (100)

What's the initial effort estimate per feature? (If needed)

What was the initial MVP? (If needed)

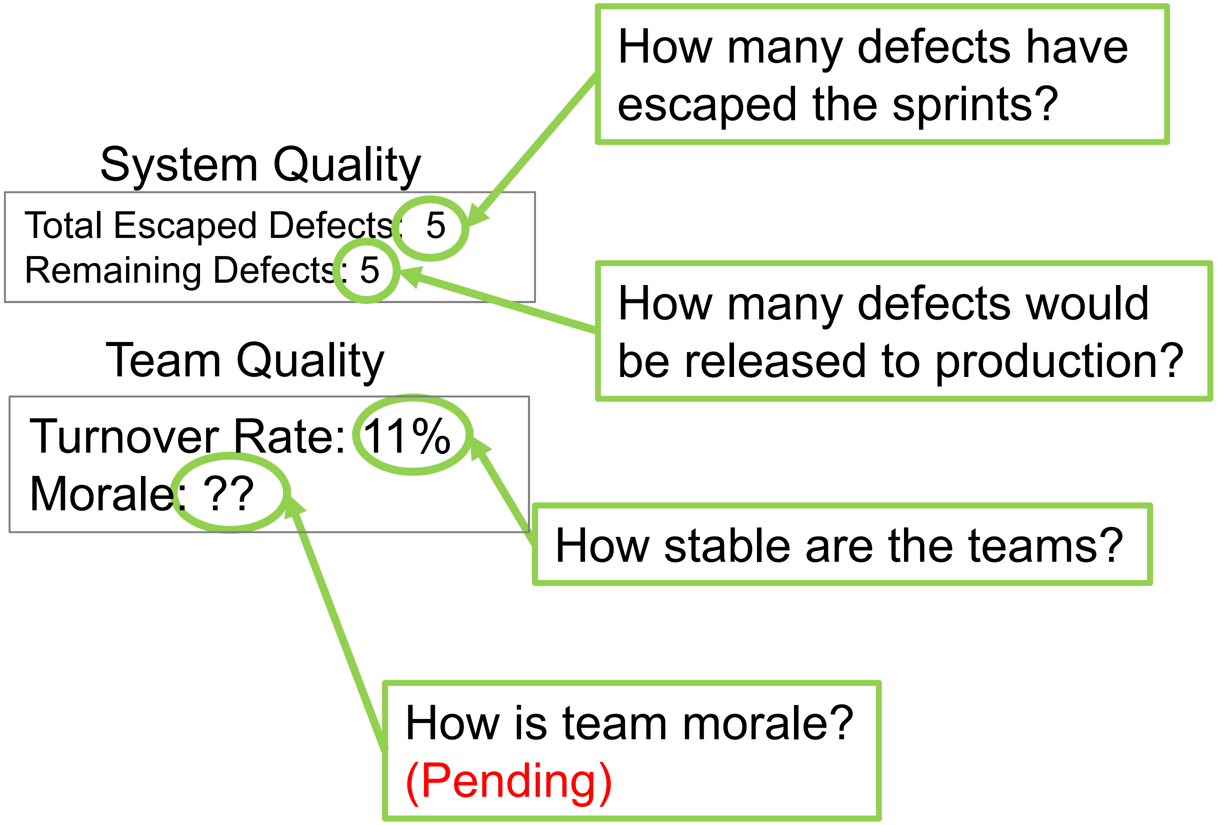
What's the minimum number of features I can release?

What's the effort estimate per feature?

Green = Done
Blue = Expected to be Done
Red = Initially Planned but not expected to be done

fppt.com

Quality



System Quality

Total Escaped Defects: 5
Remaining Defects: 5

Team Quality

Turnover Rate: 11%
Morale: ??

How many defects have escaped the sprints?

How many defects would be released to production?

How stable are the teams?

How is team morale? (Pending)

What about Funding?

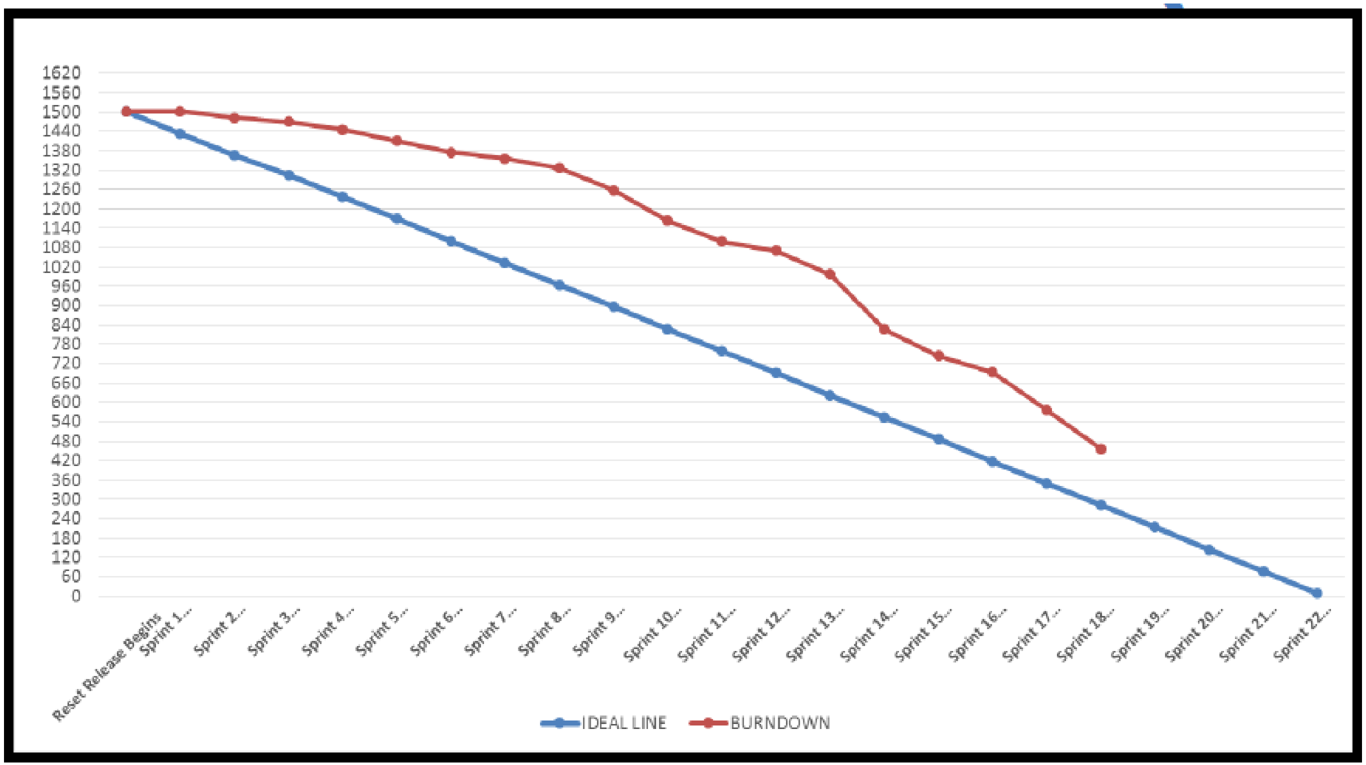
- We pay a FFP per team
- Easy to calculate the release cost
  - Team 1: 3-Month release = $150
- Easy to calculate a feature costs
  - Team 1: 3-month release, if a feature is 1/3 of the effort… The feature costs $50.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	…
Team 1	$50	$50	$50	$50	$50	$50	$50	$50	$50
Team 2	$42	$42	$42	$42	$42	$42	$42	$42	$42
Team n	$45	$45	$45	$45	$45	$45	$45	$45	$45

Notional Payment Table

fppt.com

Release Status



Sprint	SP Planned	SP Accepted	SP Remaining
17	118 SP	118 SP	497 SP
18	119 SP	119 SP	378 SP
19	108 SP	95	283
20	95	95	188
21	94	94	94
22	94	94	0

Release Summary

Release Date: XX/XX/XXXX
UAT Date: XX/XX/XXXX
UAT Date: XX/XX/XXXX

- Feature 1 (100)
- Feature 2 (75/60)
- Feature 3 (300/320)
- Feature 4 (450)
- Feature 5 (300) MVP
- Feature 6 (75) MVP
- Feature 7 (100)
- Feature 8 (100)

System Quality

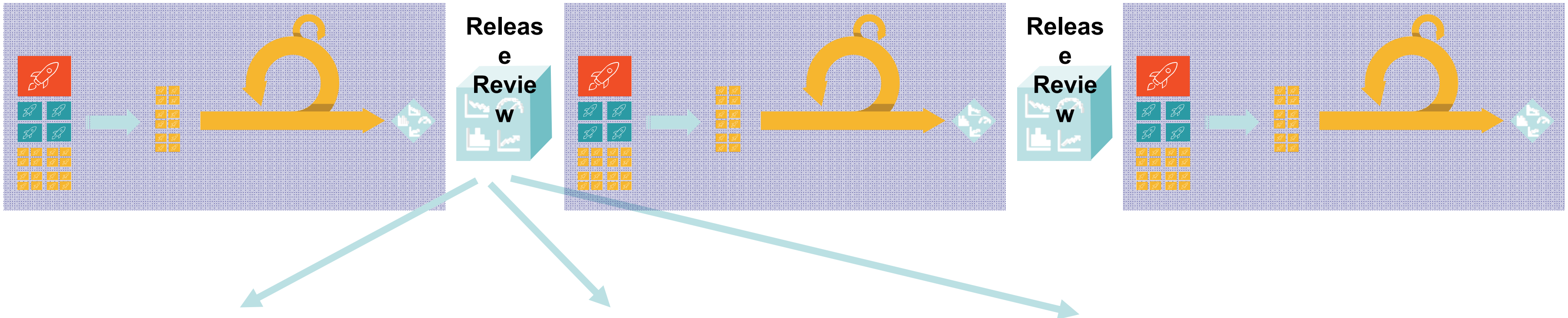
Total Escaped Defects: 5
Remaining Defects: 5

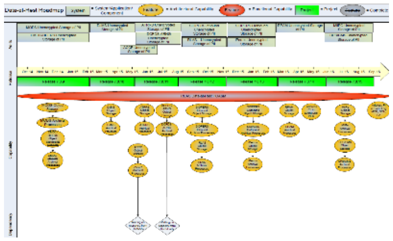
Team Quality

Turnover Rate: 11%
Morale: ??

Questions

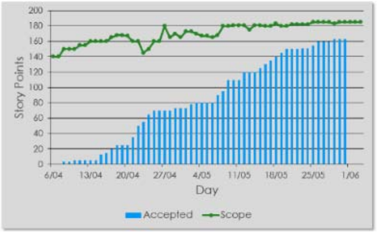
EVALUATION AT RELEASE REVIEW





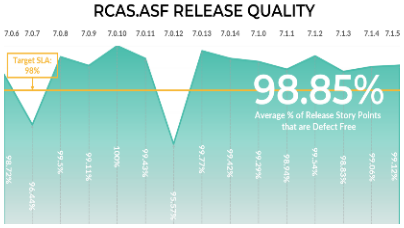
Roadmap

Did we deliver expected features?
Is the roadmap still valid?



Burn Up Chart

Are we still on track to deliver all features per roadmap?
Are we adding more features?
Are our feature level estimates valid?



Release Quality

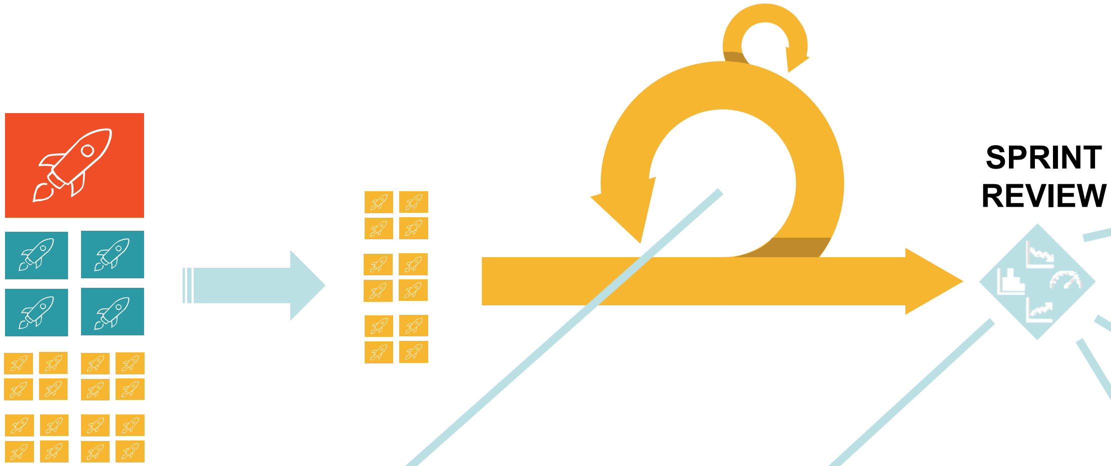
How many escaped defects?
How much work (story points) escaped the release?
Is the code coverage adequate?
Is test automation progressing?

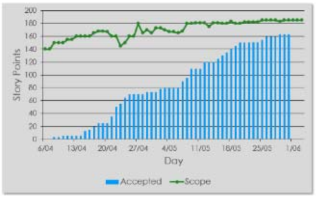
Oversight

Based on metrics (empirical data) continue, stop or change?

fppt.com

EVALUATION AT SPRINT REVIEW





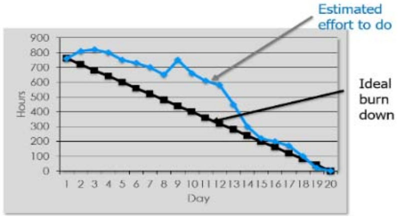
Burn Up Chart

Are we still on track to deliver all features per roadmap?
Are we adding more features?
Are our feature level estimates valid?

RCAS.ASF RELEASE QUALITY

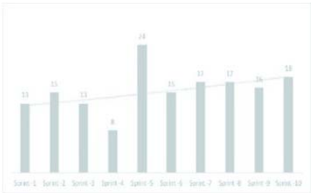
Sprint Quality

How many escaped defects?
How much work (story points) escaped the release?
Is the code coverage adequate?
Is test automation progressing?



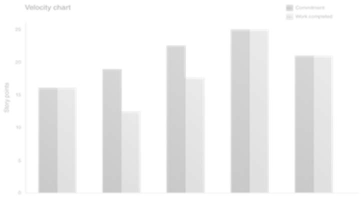
Sprint Burndown

During Sprint: Are we on track to deliver on all sprint commitments?
During Demo: Did we deliver on all sprint commitments?



Velocity

Did the sprint velocity match predicted velocity?
Are we on track to deliver on release commitments?

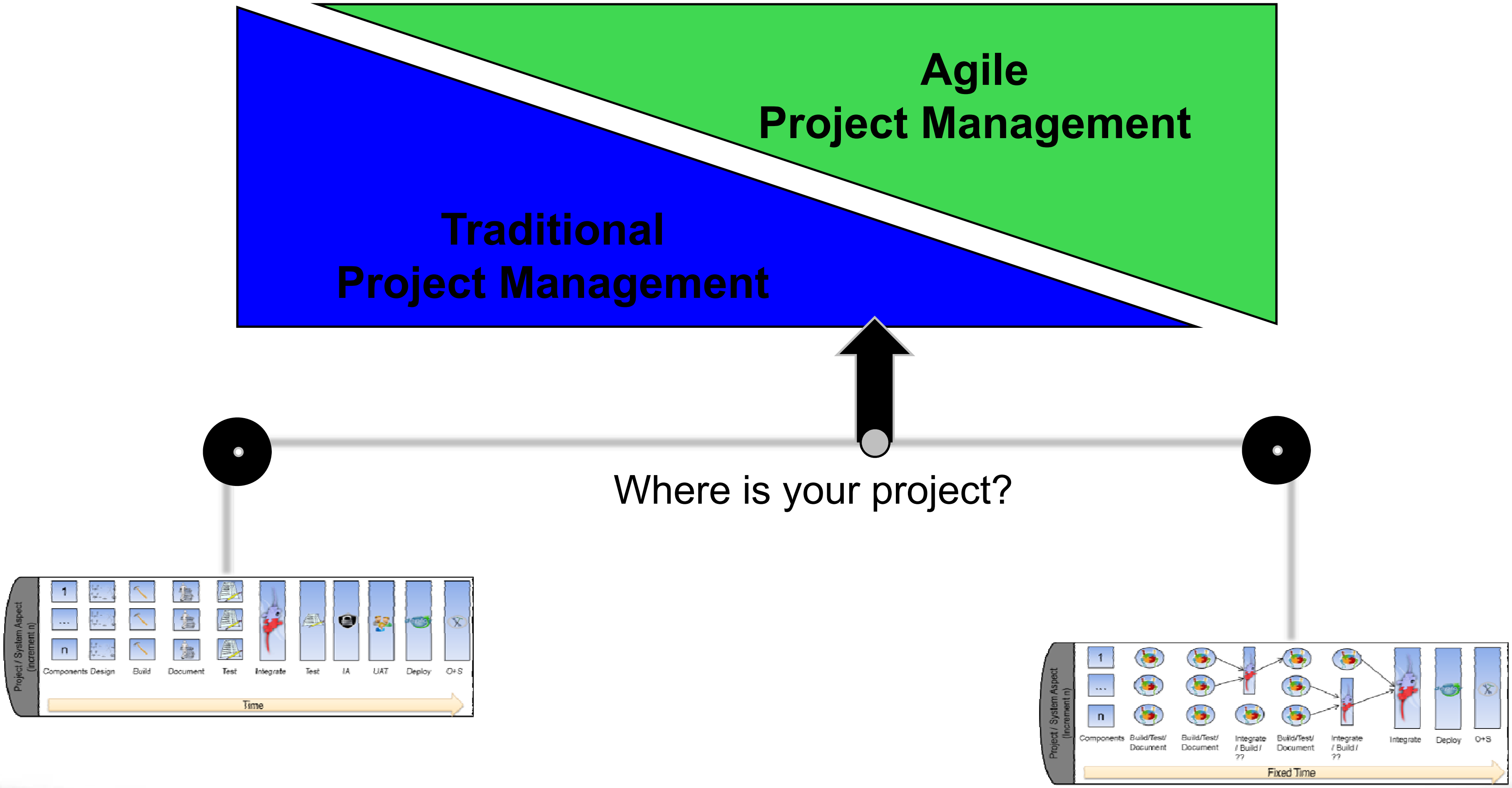


Committed vs Delivered

How many stories changed?
How is that level of change affecting efficiency?

fppt.com

The PM Spectrum



Agile Project Management

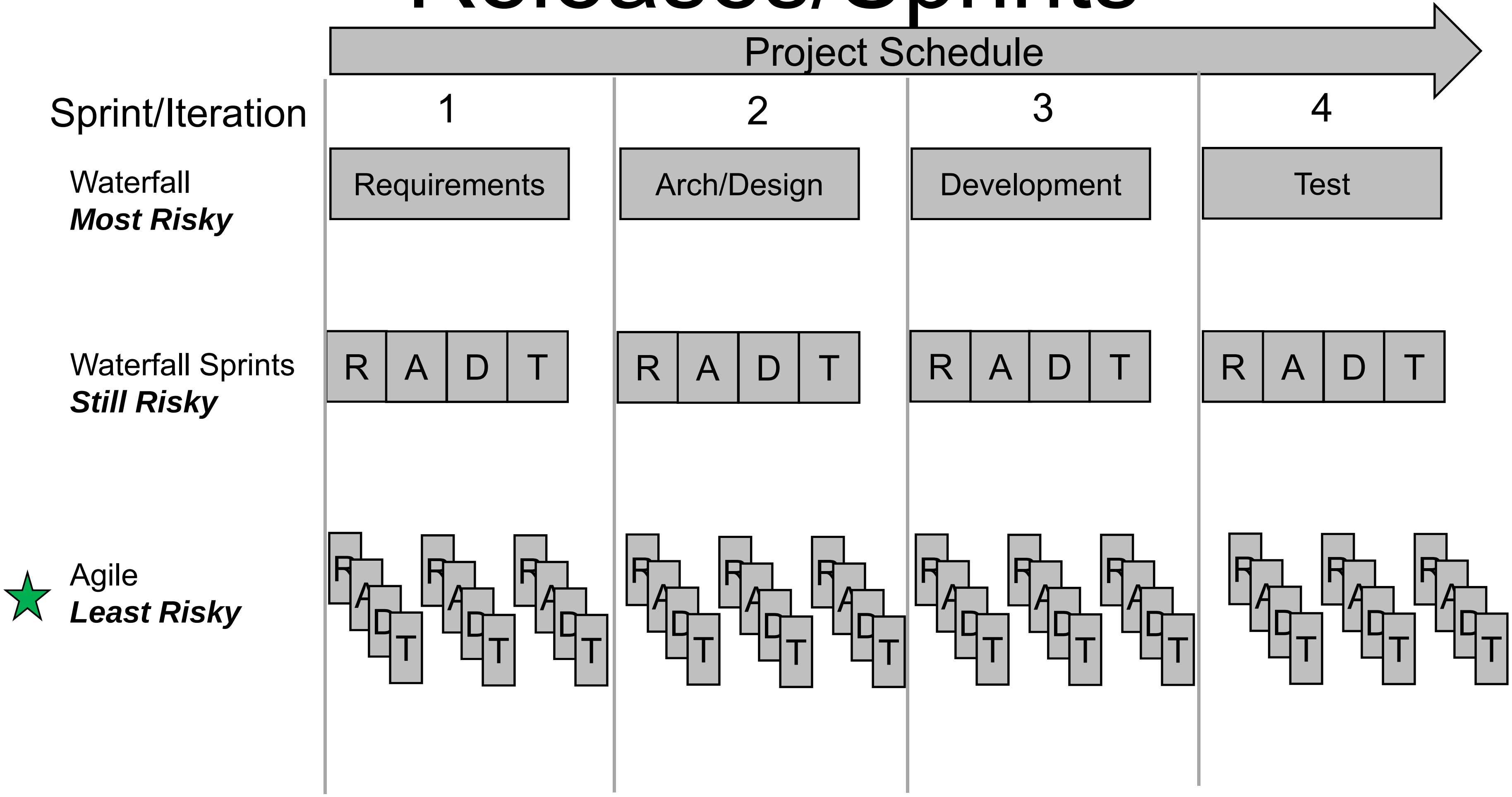
Traditional Project Management

Where is your project?

Modified from: http://leadinganswers.typepad.com/leading_answers/2007/06/agile_suitabili.html

fppt.com

Decide Structure of Releases/Sprints



Sprint/Iteration	1	2	3	4
Waterfall ***Most Risky***	Requirements	Arch/Design	Development	Test
Waterfall Sprints ***Still Risky***	R A D T	R A D T	R A D T	R A D T
★ Agile ***Least Risky***	R A D T R A D T R A D T	R A D T R A D T R A D T	R A D T R A D T R A D T	R A D T R A D T R A D T

fppt.com

Team Velocity

- Team Velocity: is a measure of the amount of work a **Team** can complete during a single Sprint.
- Aspect: Team
- Warning:
  - Don’t compare one team velocity to another
  - Don’t use one teams velocity to benchmark a “new” team

Calculating Velocity

Sprint	SP Planned	SP Accepted	SP Remaining
17	118 SP	118 SP	497 SP
18	119 SP	119 SP	378 SP
19	108 SP	95	283
20	95	95	188
21	94	94	94
22	94	94	0

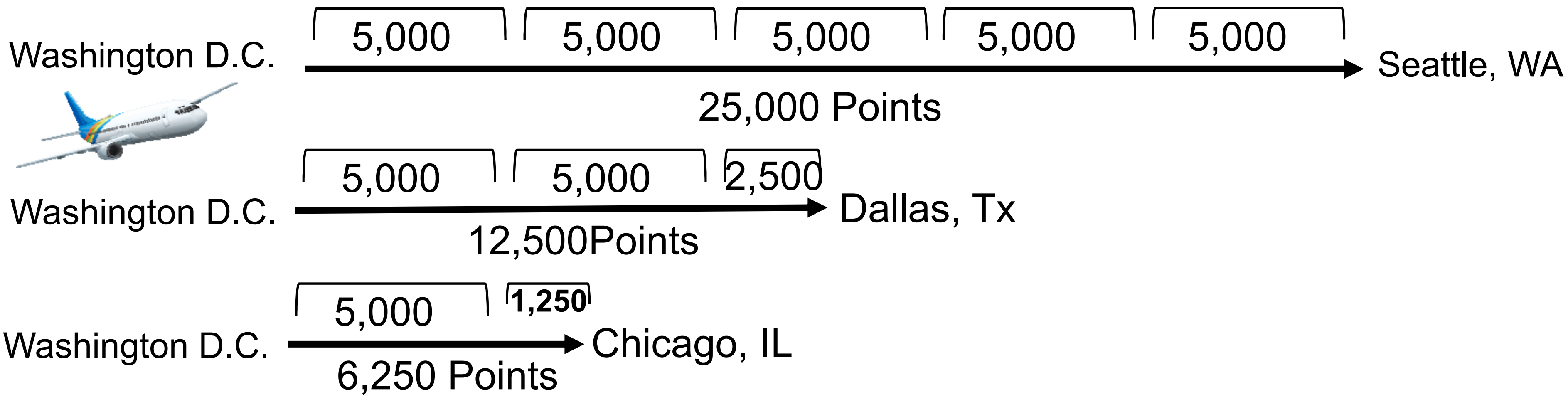
Why is Sprint 19 only 108?

What things may effect a Teams velocity?

What might the team estimate the Planned SP for Sprint 19 if we just used Sprint 17+18 data?

fppt.com

Comparing Velocities Between Teams



Washington D.C. — 5,000 | 5,000 | 5,000 | 5,000 | 5,000 → Seattle, WA

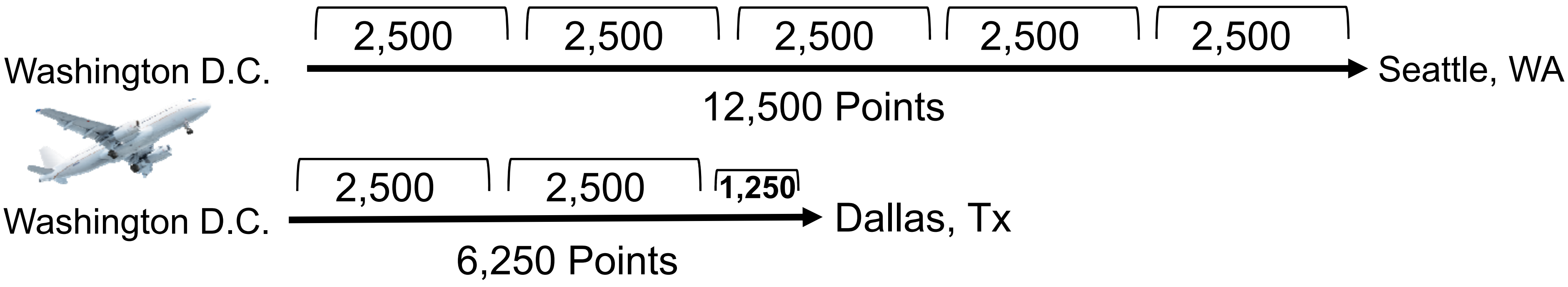
25,000 Points

Washington D.C. — 5,000 | 5,000 | 2,500 → Dallas, Tx

12,500Points

Washington D.C. — 5,000 | 1,250 → Chicago, IL

6,250 Points



Washington D.C — 2,500 | 2,500 | 2,500 | 2,500 | 2,500 → Seattle, WA

12,500 Points

Washington D.C. — 2,500 | 2,500 | 1,250 → Dallas, Tx

6,250 Points