

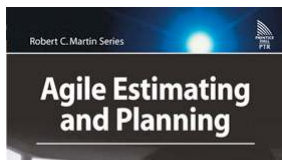
Agile Estimating and Planning

Mike Cohn

10 November 2009

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Mike Cohn - background

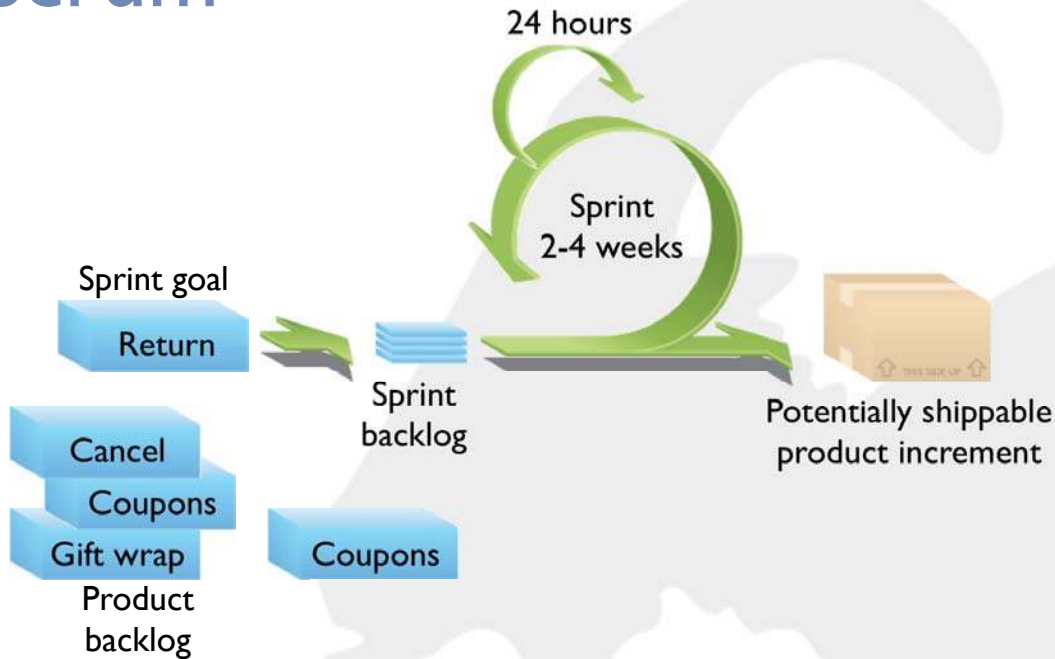


- Agile coach and trainer
- Founding member and director of Agile Alliance and Scrum Alliance
- Founder of Mountain Goat Software
- Ran my first Scrum project back in 1995
- Typical programmer to manager etc. progression



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Scrum



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What's a good plan?

- A good plan is one that supports reliable decision-making
- Will go from
 - We'll be done in the third quarter
 - We'll be done in August
 - We'll be done August 18th

"It's better to be roughly right than precisely wrong."

~John Maynard Keynes



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What makes planning agile?

Is more focused on planning than the plan

Encourages change

Results in plans that are easily changed

Is spread throughout the project



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Product, release, iteration planning

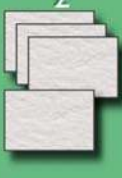
Release 1 Release 2 Release 3

Release Plan

Iteration 1



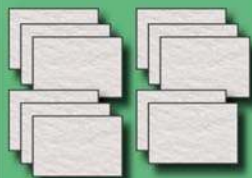
Iteration 2



Iteration 3



Iterations 4-7



We'll focus here today

Task A	8 hours
Task B	16 hours
Task C	5 hours
Task D	8 hours



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Agenda

- Product backlog estimation units
 - Story points
 - Ideal time
- Techniques for estimating
- Iteration planning
- Release planning



Estimating in
Story Points



Product Backlog

As a frequent flyer, I want to...	3
As a frequent flyer, I want to...	5
As a frequent flyer, I want to...	5
As a frequent flyer, I want to...	2
As a frequent flyer, I want to...	2

Iteration Backlog

Code the UI	8
Write test fixture	6
Code middle tier	12
Write tests	5
Automate tests	4

We're talking about these right now



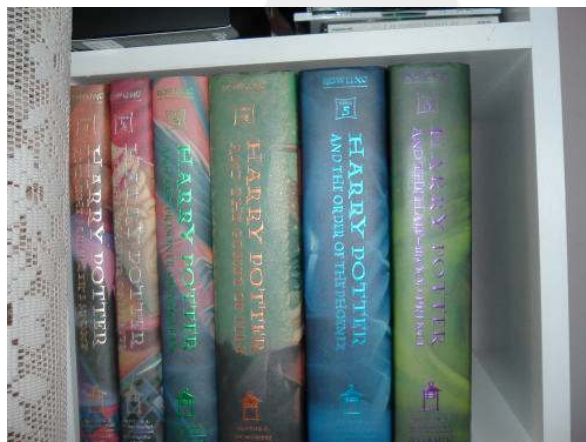
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How long will it take...



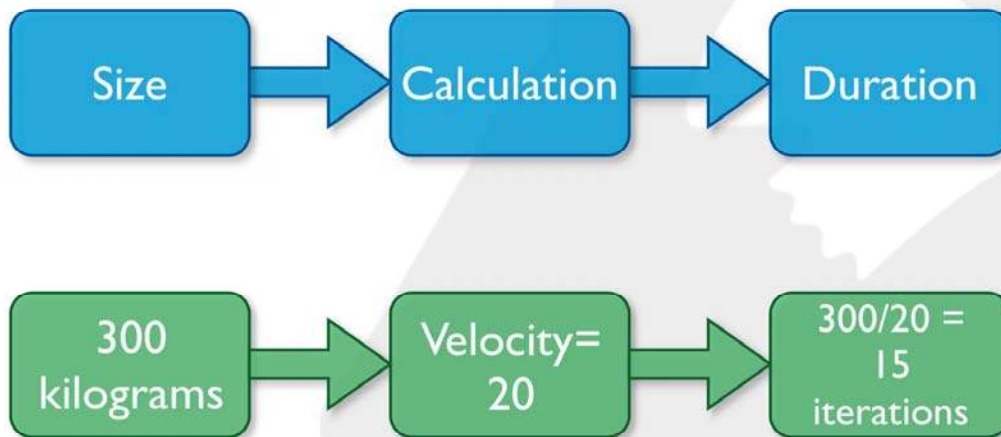
- ...to read the latest Harry Potter book?
- ...to drive to Minneapolis?



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Estimate size; derive duration



Measures of size

- Traditional and agile measure size differently



Story points

- The “bigness” of a task
- Influenced by
 - How hard it is
 - How much of it there is
- Relative values are what is important:
 - A login screen is a 2.
 - A search feature is an 8.
- Points are unit-less

As a user, I want to be able to have some but not all items in my cart gift wrapped.

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Dog points

Assign “dog points” to the following breeds

Labrador retriever
Dachshund
Great Dane
Poodle
German Shepherd
Terrier
St. Bernard
Bulldog



One order of magnitude

- We're good over one order of magnitude
- So think about where to place it on your product backlog



Estimating in
Ideal Time



Ideal time

- How long something would take if
 - it's all you worked on
 - you had no interruptions
 - and everything you need is available
- The ideal time of a football game is 60 minutes
 - Four 15-minute quarters
- The elapsed time is much longer (3+ hours)



Ideal time vs. elapsed time

- It's easier to estimate in ideal time
- It's too hard to estimate directly in elapsed time
 - Need to consider all the factors that affect elapsed time at the same time you're estimating

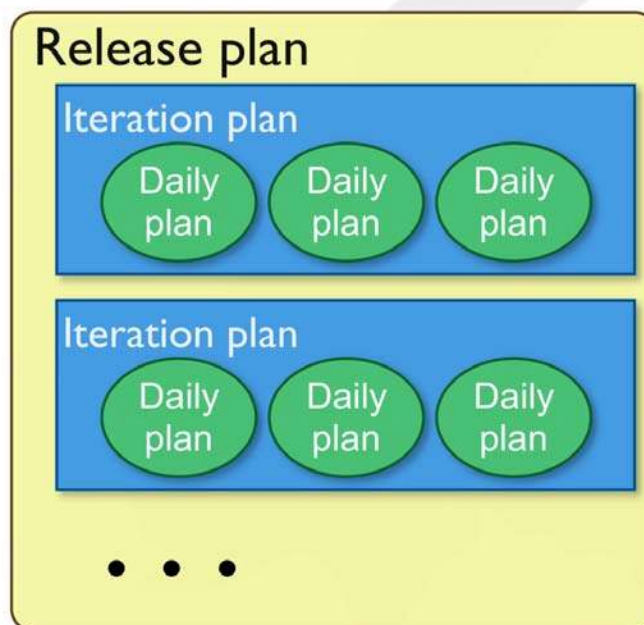


Comparing the approaches

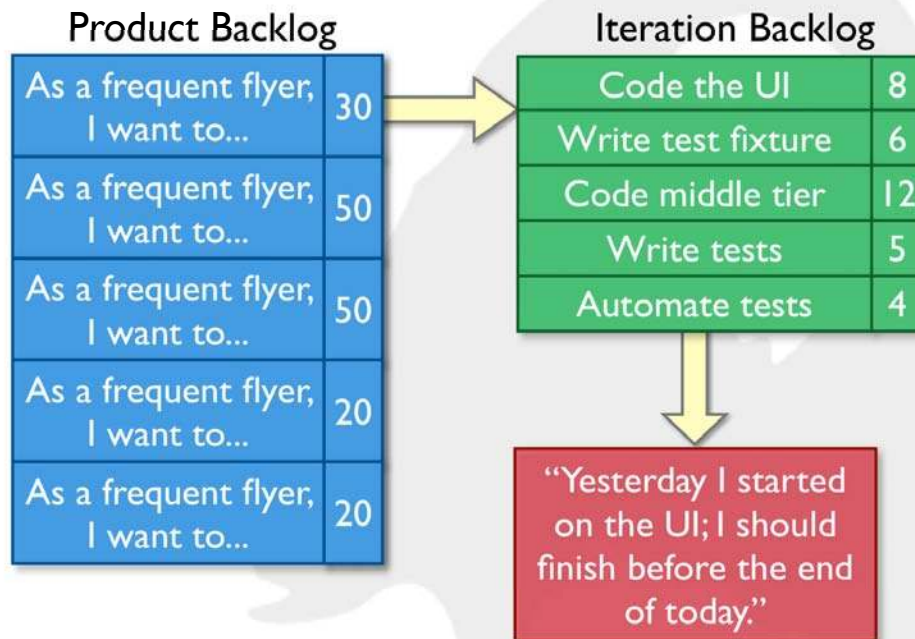
- Story points help drive cross-functional behavior
- Story point estimates do not decay
- Story points are a pure measure of size
- Estimating in story points is typically faster
- My ideal days cannot be added to your ideal days
- Ideal days are easier to explain outside the team
- Ideal days are easier to estimate at first



Three levels of planning...



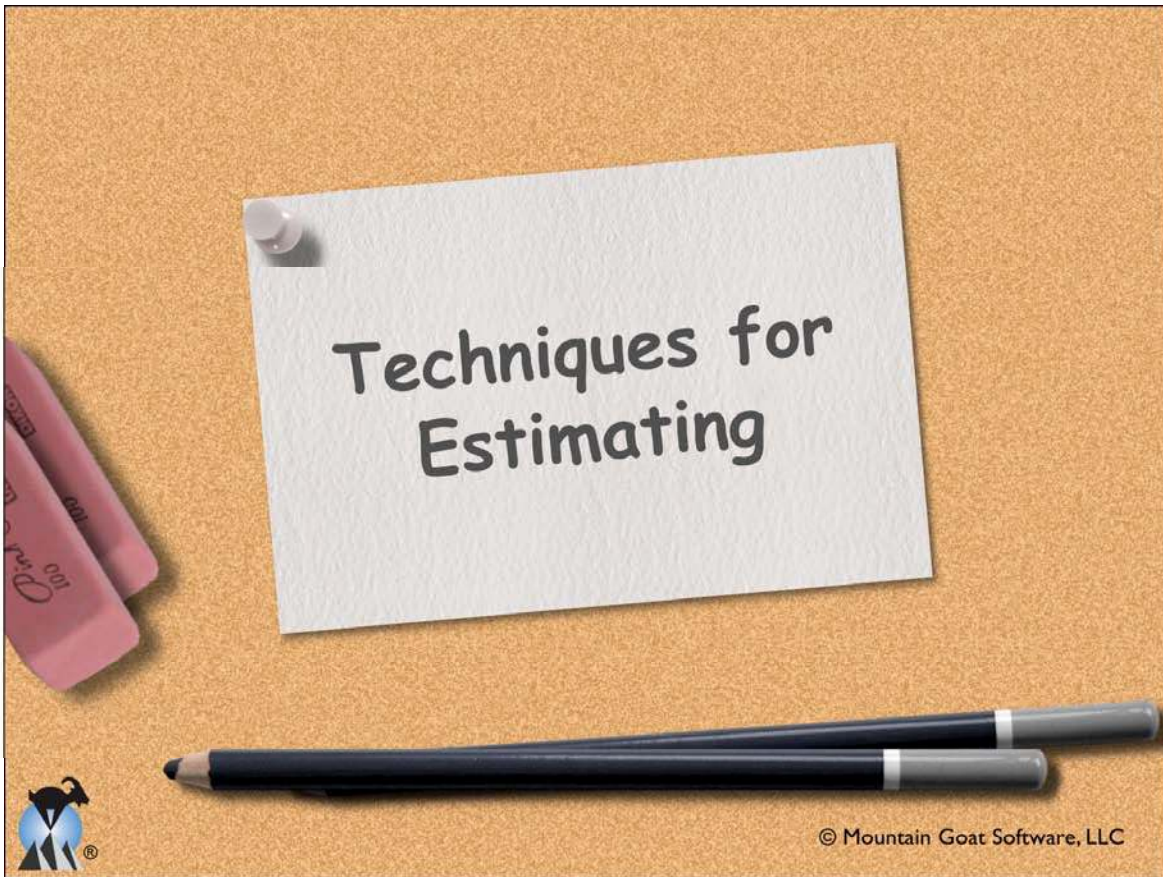
...three levels of precision



What I usually do

- I prefer story points
- ...but they make some teams uncomfortable, so I'll
 - Start with ideal time
 - Gives the team a nice foundation for the initial stories
 - Helps team get started
 - Define “1 story point = 1 ideal day”
 - Then
 - Gradually convert team to thinking in unit-less story points
 - “This story is like that story.”
 - Stop talking about how long it will take





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Estimate by analogy

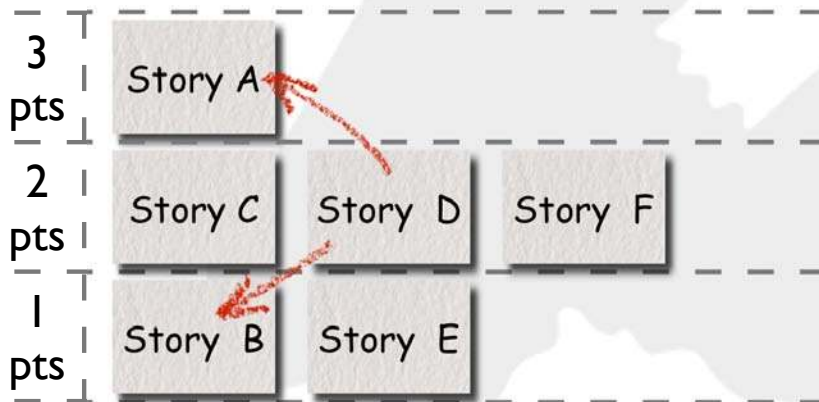
- Comparing a user story to others
 - “This story is like that story, so its estimate is what that story’s estimate was.”
- Don’t use a single gold standard
- Triangulate instead
 - Compare the story being estimated to multiple other stories



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Triangulation

- Confirm estimates by comparing the story to multiple other stories.
- Group like-sized stories on table or whiteboard



Disaggregation

- Breaking a big story into smaller stories or tasks
 - You know how long the smaller tasks take
 - So, disaggregating to something you know lets you estimate something bigger you don't know
- Sometimes very useful
- But disaggregating too far causes problems
 - Forgotten tasks



How much effort?

- A little effort helps a lot
- A lot of effort only helps a little more



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Use the right units

- Can you distinguish a 1-point story from a 2?
 - How about a 17 from an 18?
- Use a set of numbers that make sense; I like:
 - 1, 2, 3, 5, 8, 13, 20, 40, 100
- Stay mostly in a 1-10 range
- Nature agrees:
 - Musical tones and volume are distinguishable on a logarithmic scale

Include 0
and 1/2 if
you want



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Planning Poker®



- An iterative approach to estimating
- Steps
 - Each estimator is given a deck of cards, each card has a valid estimate written on it
 - Customer/Product owner reads a story and it's discussed briefly
 - Each estimator selects a card that's his or her estimate
 - Cards are turned over so all can see them
 - Discuss differences (especially outliers)
 - Re-estimate until estimates converge



Planning Poker® - an example



Estimator	Round 1	Round 2
Susan	3	5
Vadim	8	5
Ann	2	5
Chris	5	8



Estimate these



Product backlog item	Estimate
Read a high-level, 10-page overview of agile software development in <i>People</i> magazine.	
Read a densely written 5-page research paper about agile software development in an academic journal.	
Write the product backlog for a simple eCommerce site that sells only clocks.	
Recruit, interview, and hire a new member for your team.	
Create a 60-minute presentation about agile software development for your coworkers.	
Wash and wax your boss' Porsche.	
Read a 150-page book on agile software development.	
Write an 8-page summary of this conference for your boss.	



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Why planning poker works

- Those who will do the work, estimate the work¹
- Estimators are required to justify estimates^{2, 3}
- Focuses most estimates within an approximate one order of magnitude^{4, 5}

¹Jørgensen, Magne. 2004. *A Review of Studies on Expert Estimation of Software Development Effort*.

²Hagafors, R., and B. Brehmer. 1983. *Does Having to Justify One's Decisions Change the Nature of the Decision Process?*

³Brenner, et al. 1996. *On the Evaluation of One-sided Evidence*.

⁴Miranda, Eduardo. 2001. *Improving Subjective Estimates Using Paired Comparisons*.

⁵Saaty, Thomas. 1996. *Multicriteria Decision Making: The Analytic Hierarchy Process*.



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Why planning poker works

- Combining of individual estimates⁶ through group discussion⁷ leads to better estimates
- Emphasizes relative rather than absolute estimating
- Estimates are constrained to a set of values so we don't waste time in meaningless arguments
- Everyone's opinion is heard
- It's quick and fun

⁶Hoest, Martin, and Claes Wohlin. 1998. *An Experimental Study of Individual Subjective Effort Estimations and Combinations of the Estimates.*

⁷Jørgensen, Magne, and Kjetil Møløy. 2002. *Combination of Software Development Effort Prediction Intervals: Why, When and How?*



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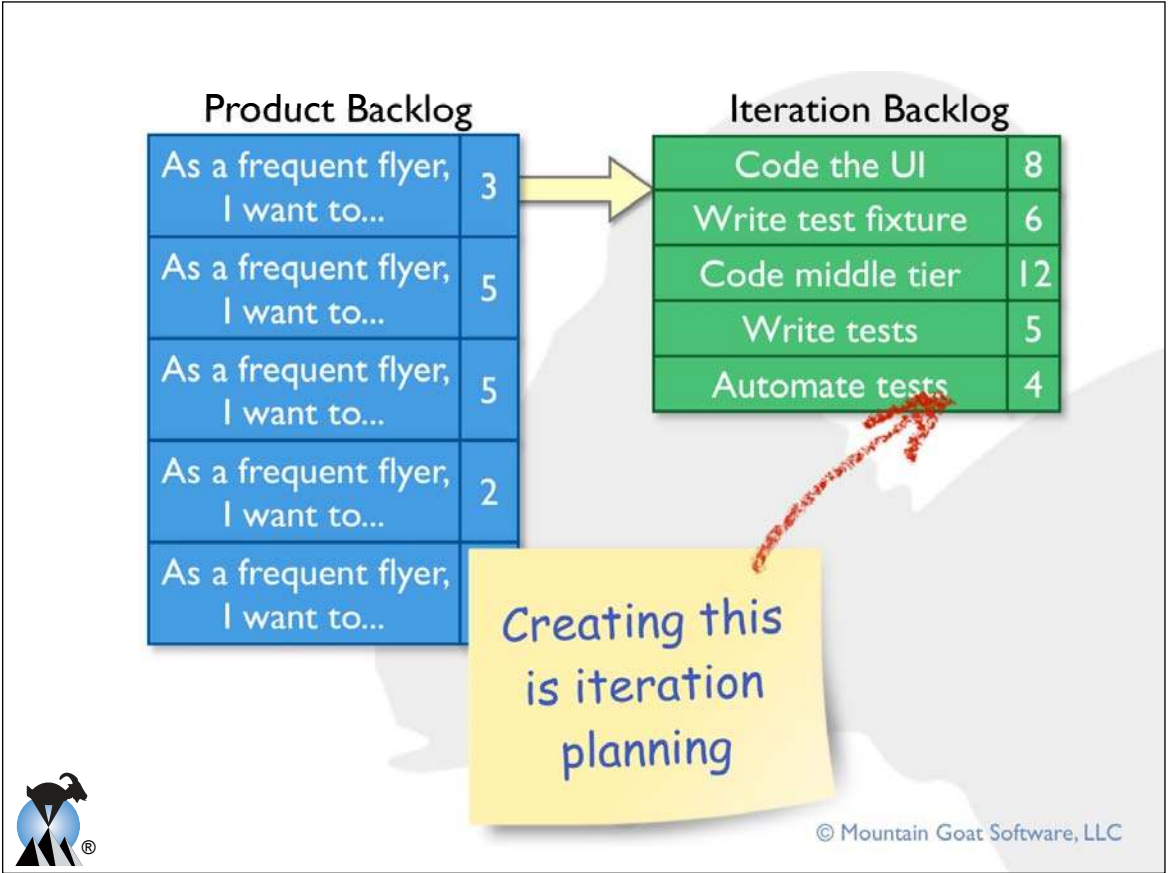
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Two approaches

- Velocity-driven iteration planning
 - “We finished 15 story points last time, let’s plan on 15 story points this time.”
 - Very unreliable in what will be accomplished during an iteration
 - Velocity is mostly useful over the long term
- Commitment-driven iteration planning



Commitment-driven iteration planning

- Discuss the highest priority item on the product backlog
- Decompose it into tasks
- Estimate each task
 - Whole team estimates each task
- Ask ourselves, “Can we commit to this?”
 - If yes, see if we can add another backlog item
 - If not, remove this item but see if we can add another smaller one



Estimate availability

Person	Hours per Day	Hours per Iteration
Sergey	4-6	40-60
Yuri	5-7	50-70
Carina	2-3	20-30
Total		110-160



It looks something like this

As a user, I want ...

2

- Code the abc class (8 hours)
- Code the user interface (4)
- Write test fixtures (4)
- Code the xyz class (6)
- Update performance tests (4)

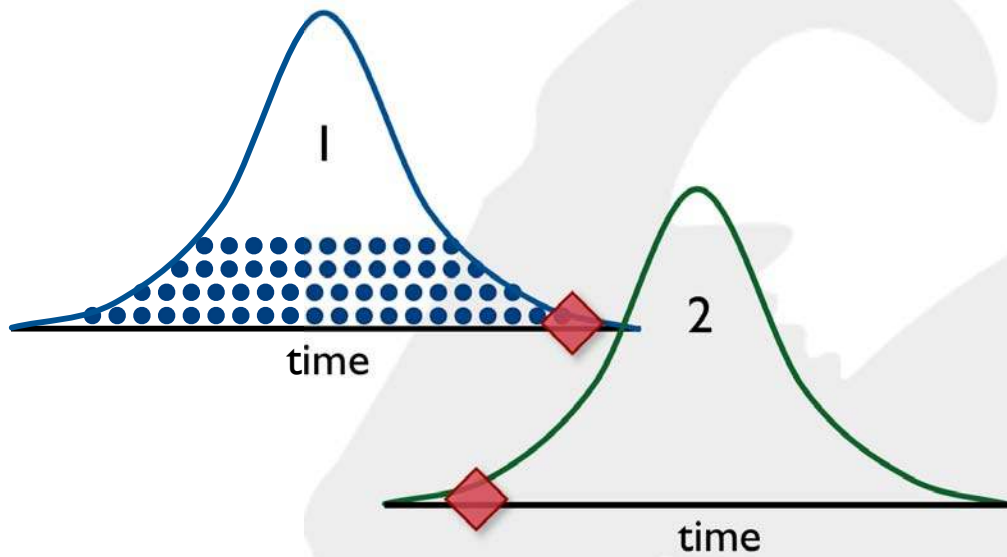
Team can commit, so they continue...

As a user, I want ...

3

- Prototype the UI (8 hours)
- Demo UI to 3 outside users (3)
- Code new UI (12)
- Update documentation (3)

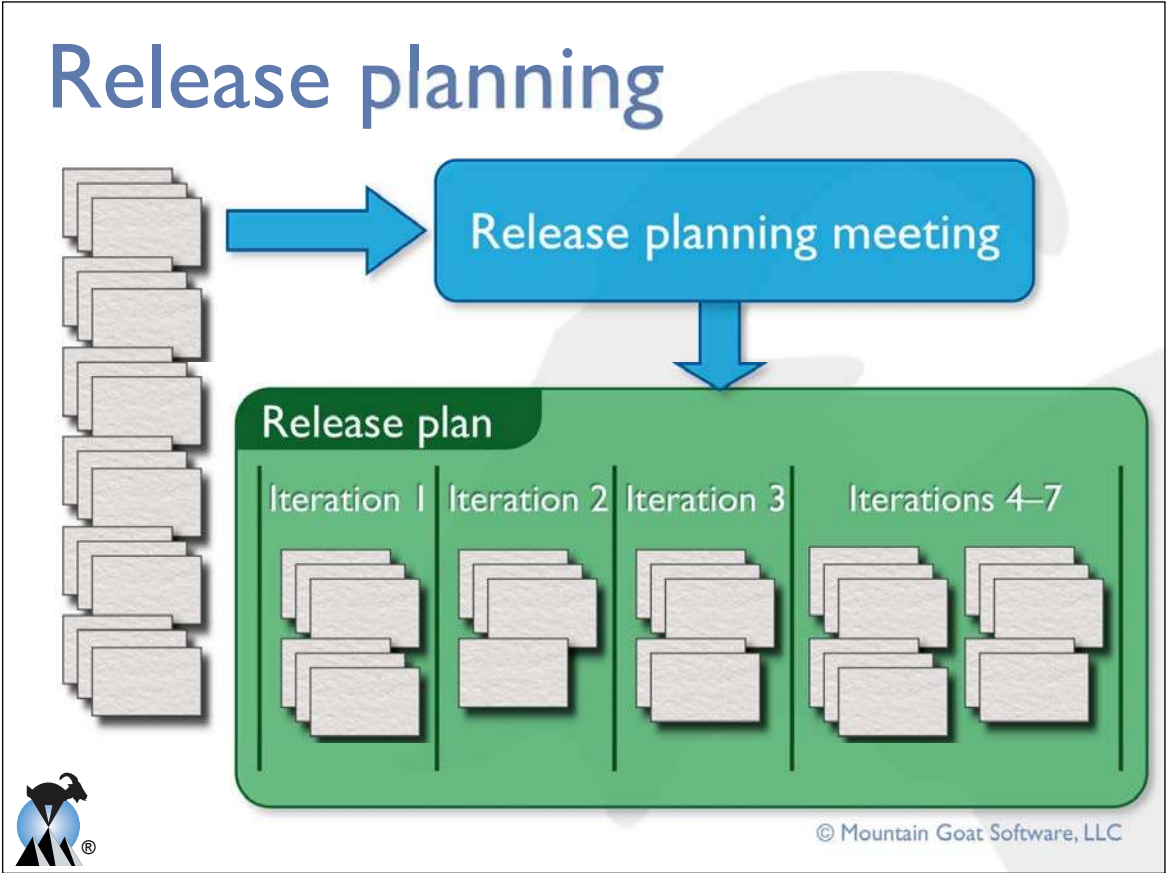




A caution

- The purpose of the iteration planning meeting is to arrive at a commitment to an iteration goal or set of product backlog items.
- The purpose of the meeting is not to come up with a list of tasks and hours.
- The tasks and estimates are a tool for determining what we can commit to.





Velocity

- To do a release plan, you need to know or have an estimate of velocity
- Three ways to get velocity:
 1. Use historical averages
 2. Run 1-2 iterations and see what you get
 3. Forecast it
- Should be expressed as a range
 - Size of range depends on familiarity of team, domain, and technologies



Forecasting velocity

- Just like commitment-driven iteration planning
 - Estimate available hours for the iteration
 - Repeat until full:
 - Pick a story, break into tasks, estimate each task



An example

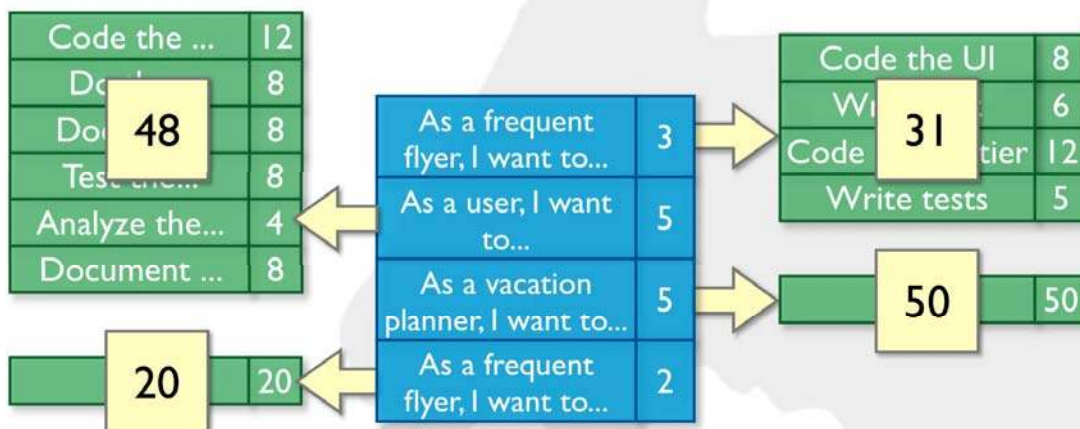
- Estimating available hours

Person	Hours per Day	Hours per Iteration
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Total		110-160



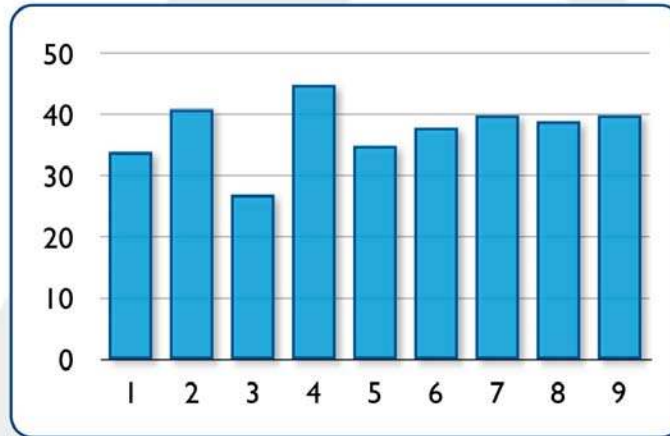
An example

At 110-160 available hours per iteration, what is the team's velocity?

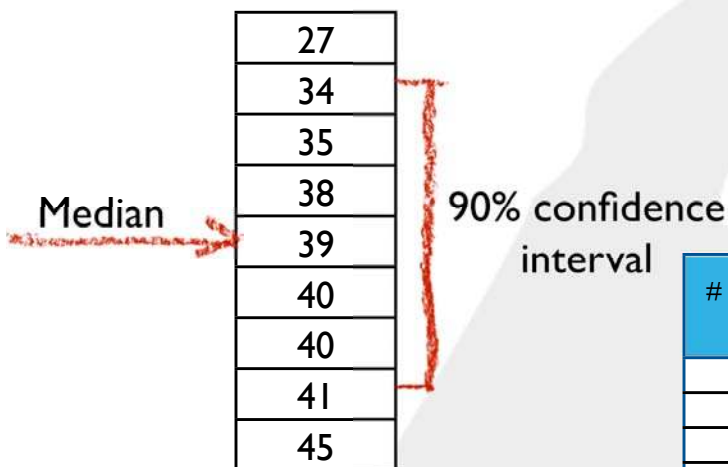


Predicting release contents

- Determine your median velocity
- Put a 90% confidence interval around it
- Predicts “best case” and “worst case”



An example



# of Historical Sprints	n th Highest & Lowest Sprint to Use
5	1
8	2
11	3
13	4
16	5
18	6
21	7
23	8
26	9



Extrapolate from velocity

Assume:
There are five
iterations left.



← We'll almost certainly get here (5×34)

← At our median velocity we'll get here (5×39)

← The most we could realistically expect (5×41)



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Upcoming public classes

Date	What	Where
Feb 1–2 Feb 3–4	Certified ScrumMaster Certified Scrum Product Owner	Dallas
March 1 March 2–3 March 4	User Stories for Agile Requirements Certified ScrumMaster Agile Estimating & Planning	Boulder
April 12 April 13–14 April 15	User Stories for Agile Requirements Certified ScrumMaster Succeeding with Scrum (new!)	San Diego

See
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for details



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