



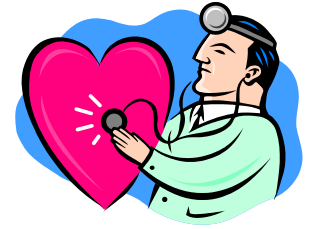
CADENCE IN AGILE PROJECTS

Sprint Length, Integration Frequency,
and Other Matters of Rhythm

Kathy Iberle

Originally presented March 14, 2013 at the Rose City SPIN
Updated in 2016

AGILE TODAY



- “The team works for a fixed period of time called a sprint.” Ken Schwaber; 2002
- “A regular iteration rhythm acts like a heartbeat for the project.” Mike Cohn; 2006

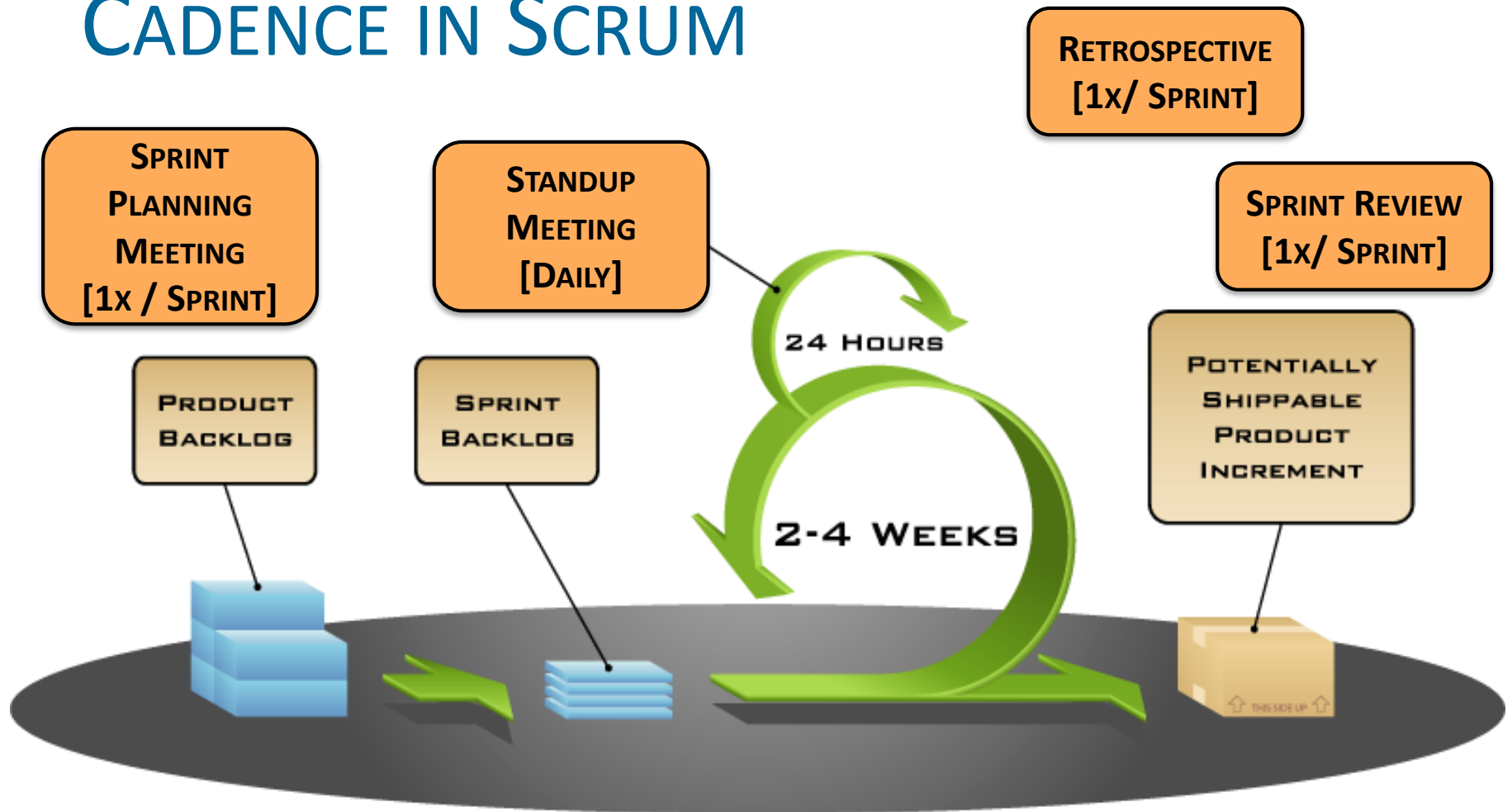
Fixed-length iterations are
an example of *cadence*

CADENCE

- *Cadence*: a regular, predictable rhythm within a process.
- Cadence increases efficiency by cutting out duplicated or avoidable work.



CADENCE IN SCRUM

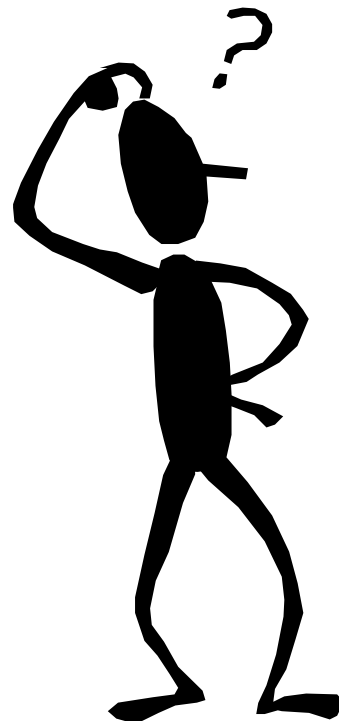


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WHAT IS A GOOD CADENCE?

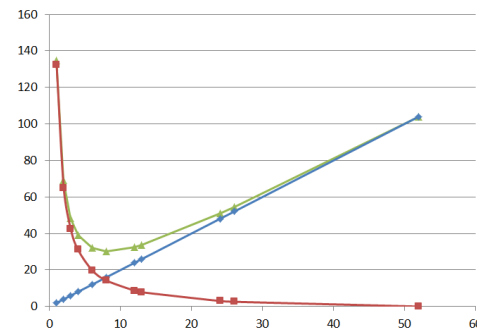
- Not too frequent, not too infrequent
- That's nice – can we be any more exact?



A SCIENTIFIC WAY TO LOOK AT CADENCE

1. Identify the benefits of the cadence
2. Identify the cost of the cadence
3. Apply mathematics to find optimal point

Fortunately, once you've seen the math, you rarely need to do actual calculations

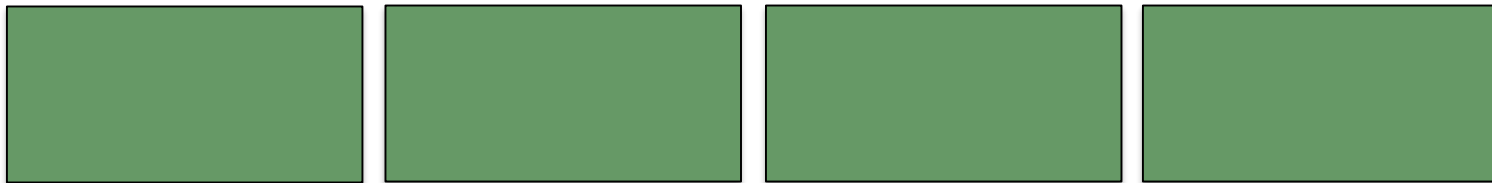


SPRINTS SPLIT THE WORK INTO BATCHES

- Waterfall: no stopping points



- Agile: a stopping point after each sprint



What do we *lose*
if there are no stopping points?

THE COST OF LONGER SPRINTS

The cost of a longer sprint is called the *Holding Cost*

Holding cost includes the cost of:

- Rework due to not stopping earlier to get feedback from customer on whether features are satisfactory
- Extra effort to fix bugs because they weren't found earlier
- Lost sales due to not having the chance to change or add a feature based on new information
- Lost profit because we didn't ship, sell, or otherwise use any features before the end of the project

Shorter Sprints => Stop more often => Lower Holding Cost

HOLDING COST ACCUMULATES

Cost of holding one month's work for one month = 

If we continue for a year without stopping:

Holding cost for first month's work
is paid 11 times



HOLDING COST ACCUMULATES

Cost of holding one month's work for one month = 

If we continue for a year without stopping:

Holding cost for first month's work
is paid 11 times



Holding cost for second month's work
is paid 10 times



HOLDING COST ACCUMULATES

Cost of holding one month's work for one month =



If we continue for a year without stopping:

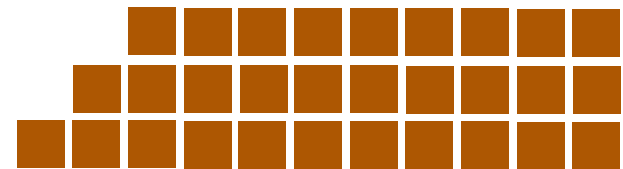
Holding cost for first month's work
is paid 11 times



Holding cost for second month's work
is paid 10 times



Holding cost for third month's work
is paid 9 times

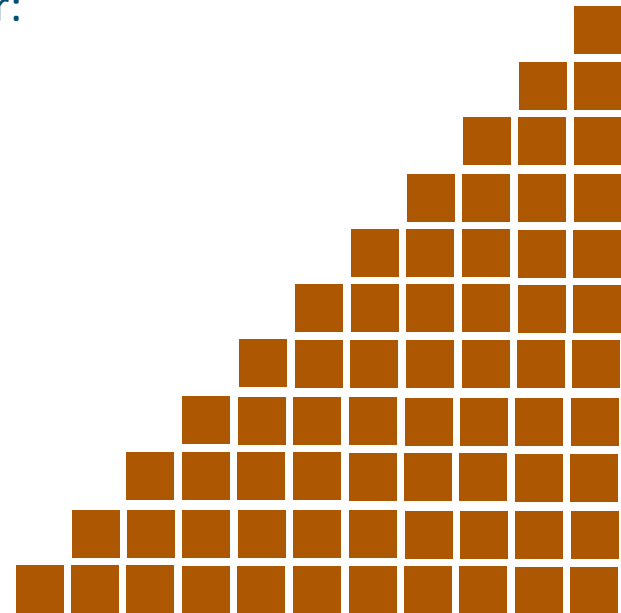


HOLDING COST ACCUMULATES

Total cost of holding the work for an entire year:

$$= H * \sum_{i=1}^{11} i = H * 66$$

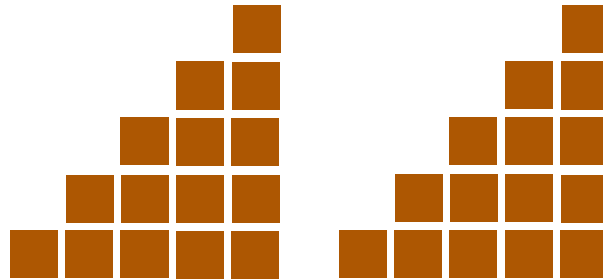
Where H = cost of holding one month's work
for one month



THE BENEFIT OF SPRINTS

Total holding cost for six month sprints

$$= H * 2 * \sum_{i=1}^5 i = H * 30$$



THE BENEFIT OF SPRINTS

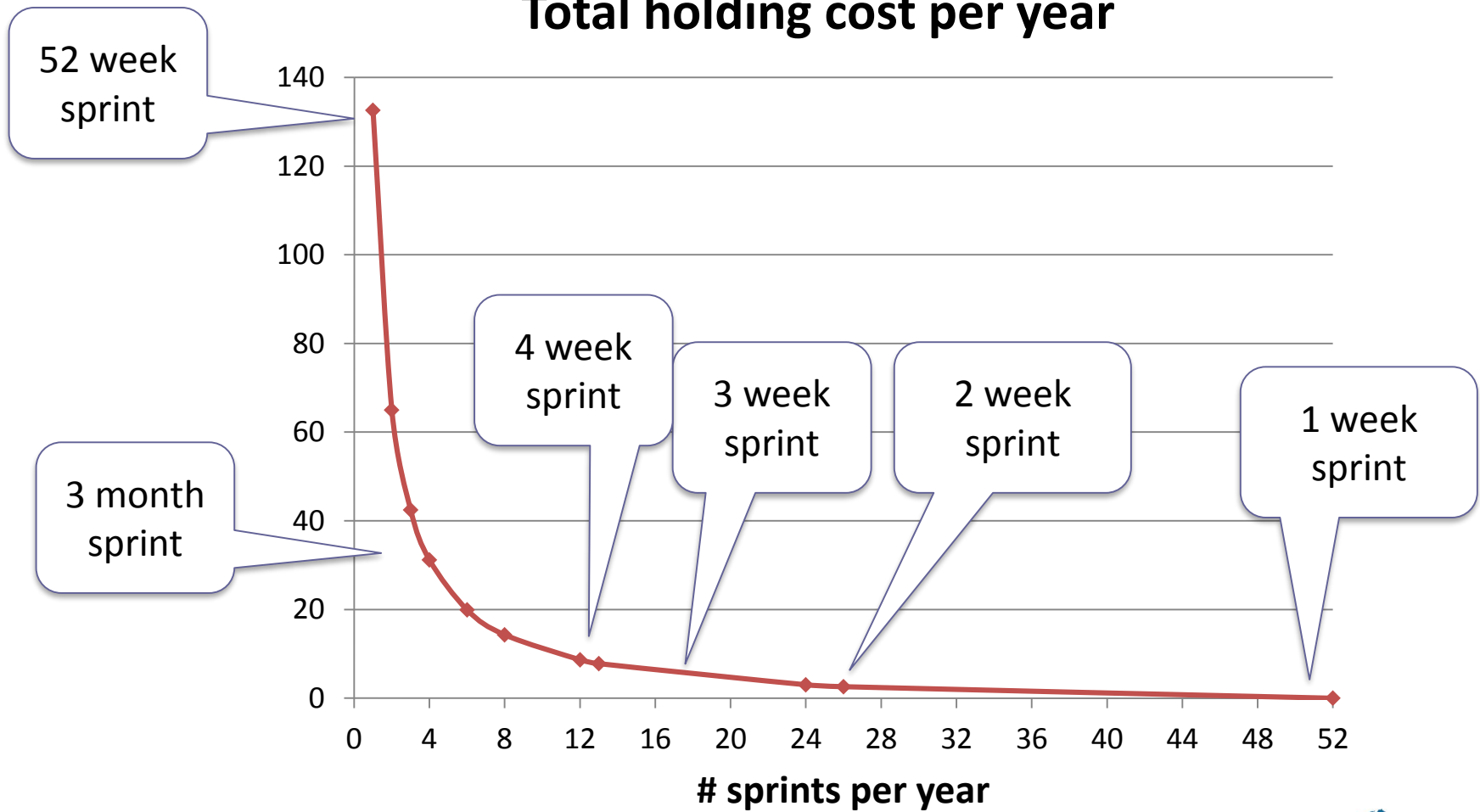
Total holding cost for three month sprints

$$= H * 4 * \sum_{i=1}^2 i = H * 12$$



TOTAL HOLDING COST

Total holding cost per year



THE COST OF SHORT SPRINTS

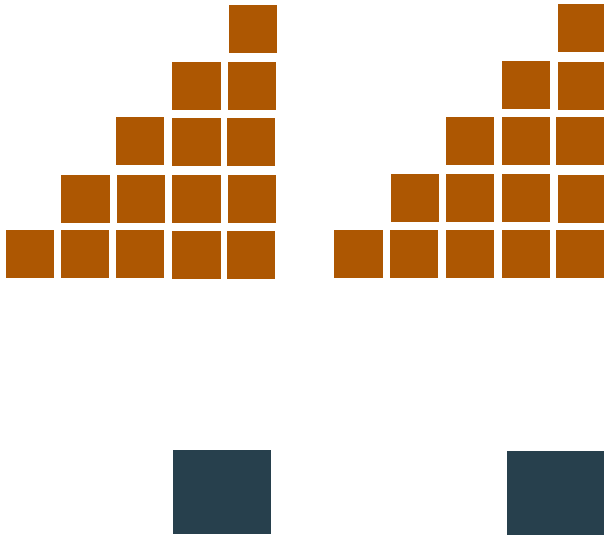
What does it cost each time we start or end a sprint?

TRANSACTION COST – SHORT SPRINTS

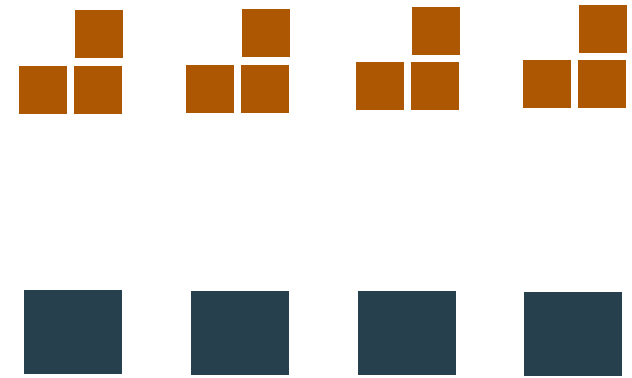
What does it cost each time we start or end a sprint?

- Running system integration and test
 - Holding sprint review and sprint planning meetings
 - Final defect review & decision-making
-
- This is called the *transaction cost*

TRANSACTION COST FOR SHORTER SPRINTS

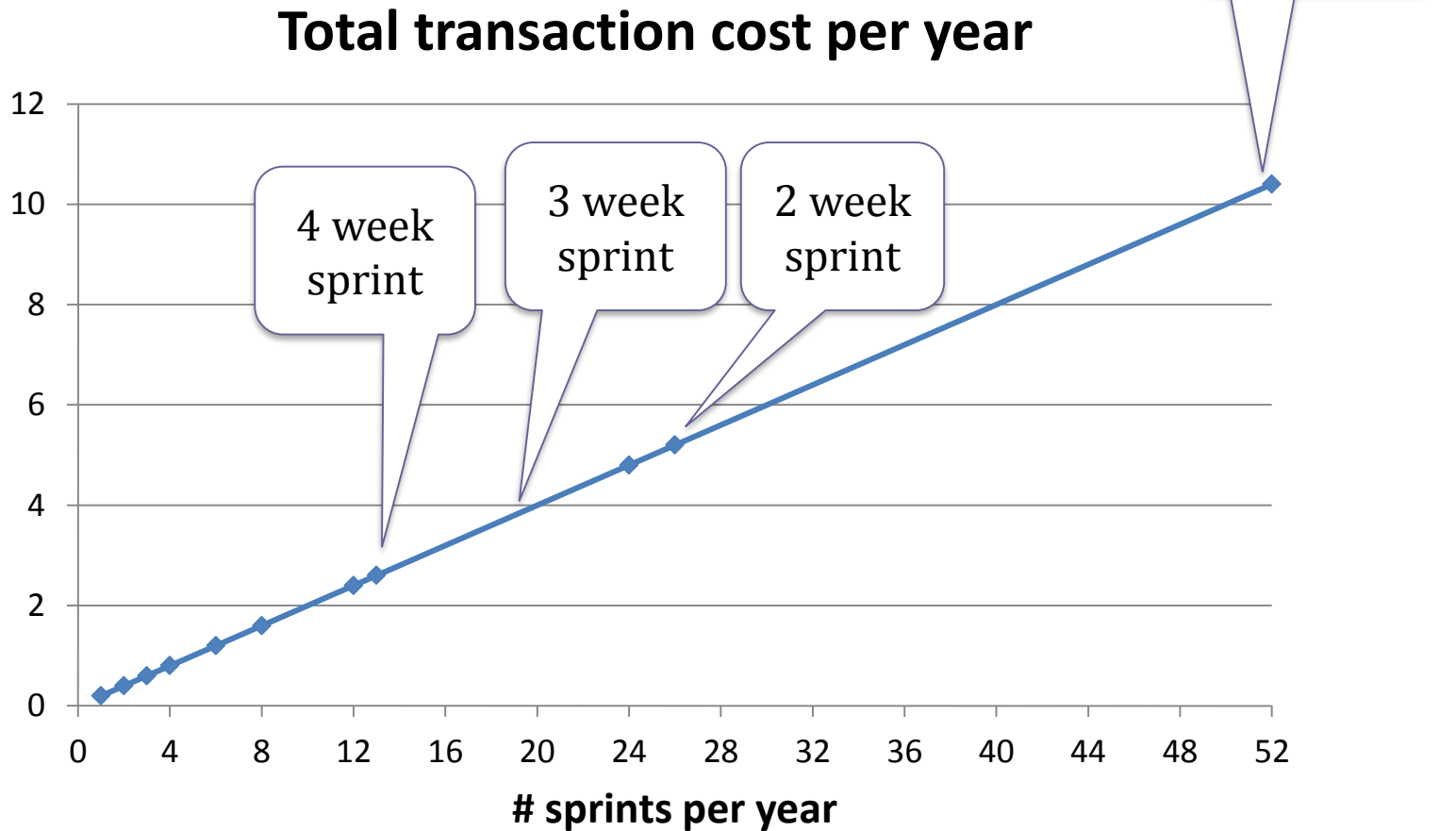


Total transaction cost
for six month sprints:

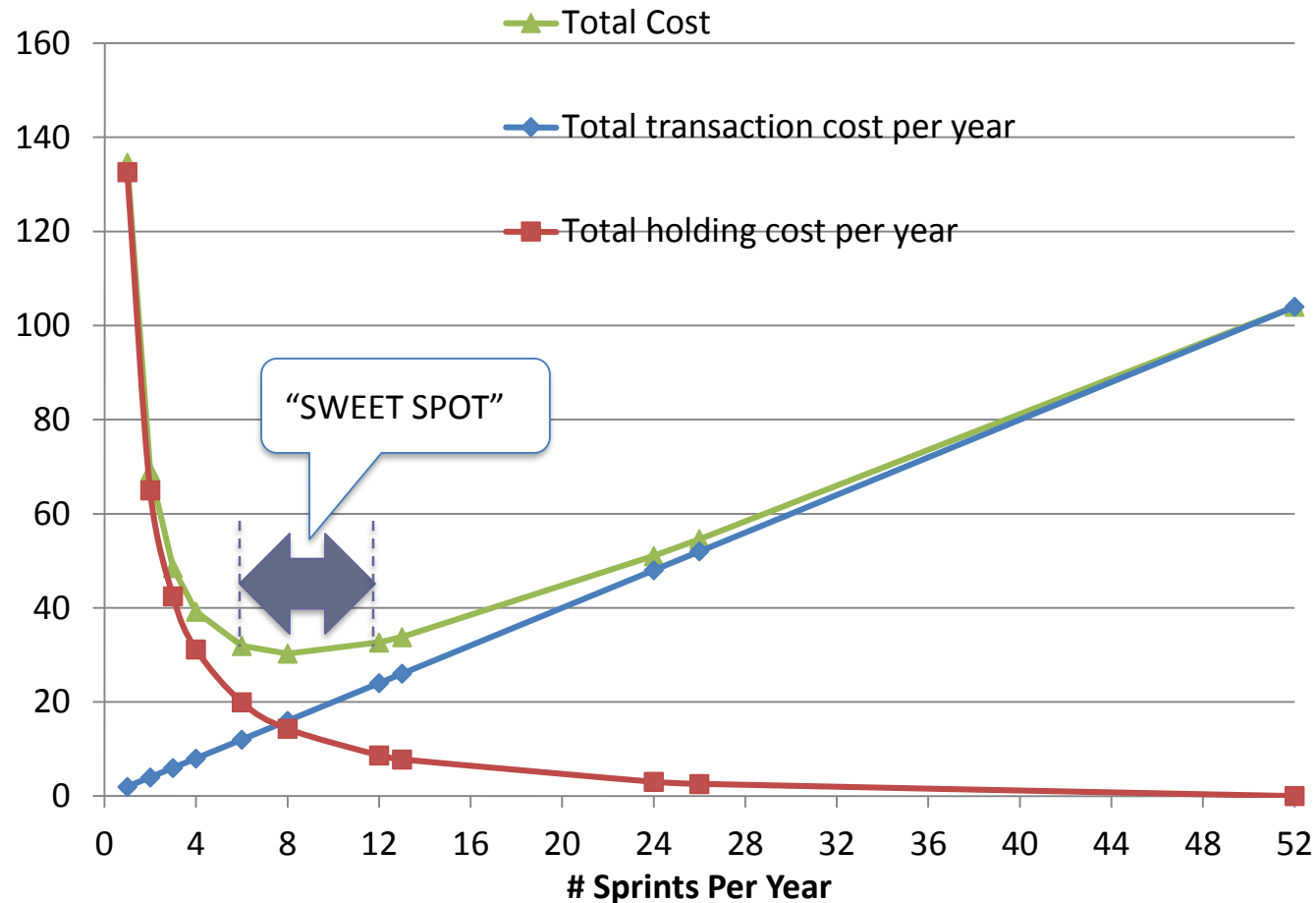


Total transaction cost
for three month sprints:

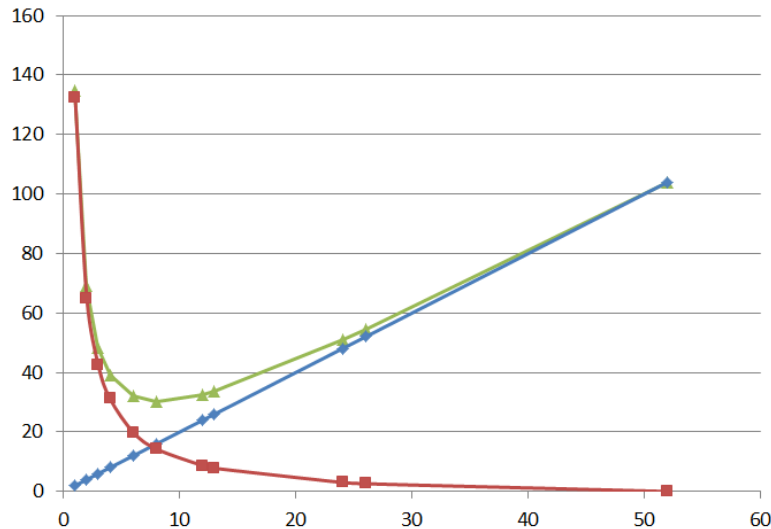
TOTAL TRANSACTION COST



TOTAL COST = HOLDING COST PLUS TRANSACTION COST

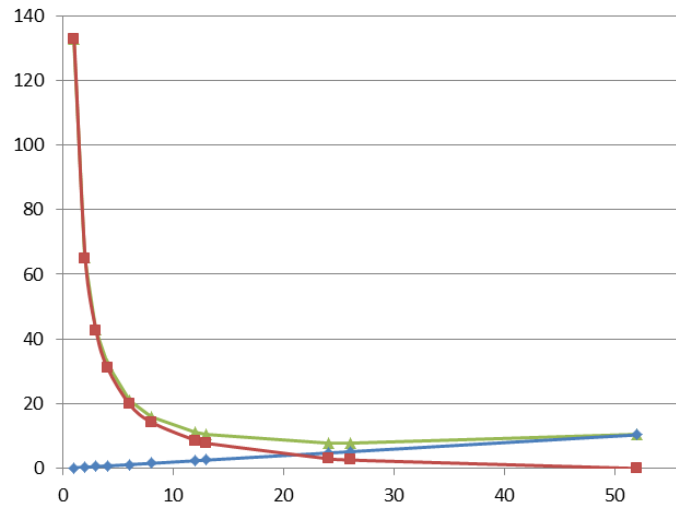


CHANGING THE TRANSACTION COST



$T = 2$

Sweet spot = 6 week sprints



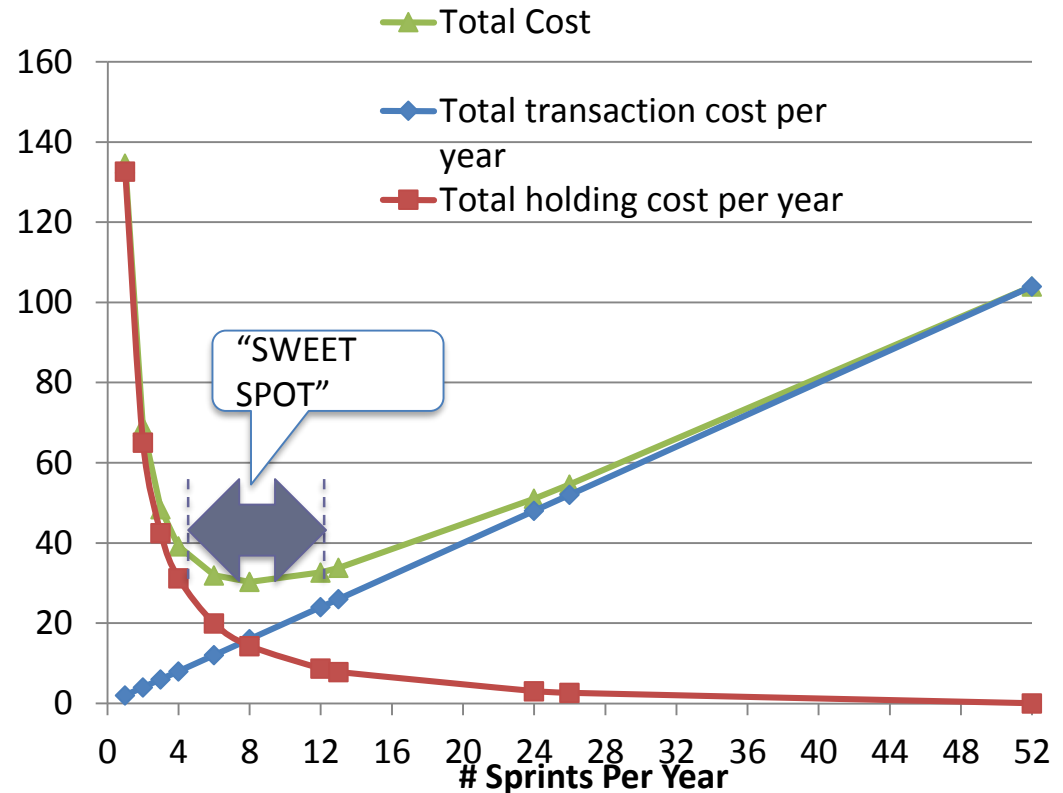
Reduce transaction cost by 90%

$T = 0.2$

Sweet spot = 2 week sprints

WHAT THIS MEANS TO US

- Big gains when moving from 1 sprint/year to 6 sprints per year
- After that, exact sprint length doesn't make nearly as much difference
- Unless the transaction cost is dramatically reduced



MIKE COHN ON SPRINT LENGTH

- How long priorities can remain unchanged
 - Willingness to go without outside feedback
 - The amount of uncertainty
- Holding Cost
- Overhead of iterating
 - Ease of getting feedback
- Transaction Cost

From Mike Cohn's book *Agile Estimating and Planning*

2ND-GENERATION LEAN VIEW

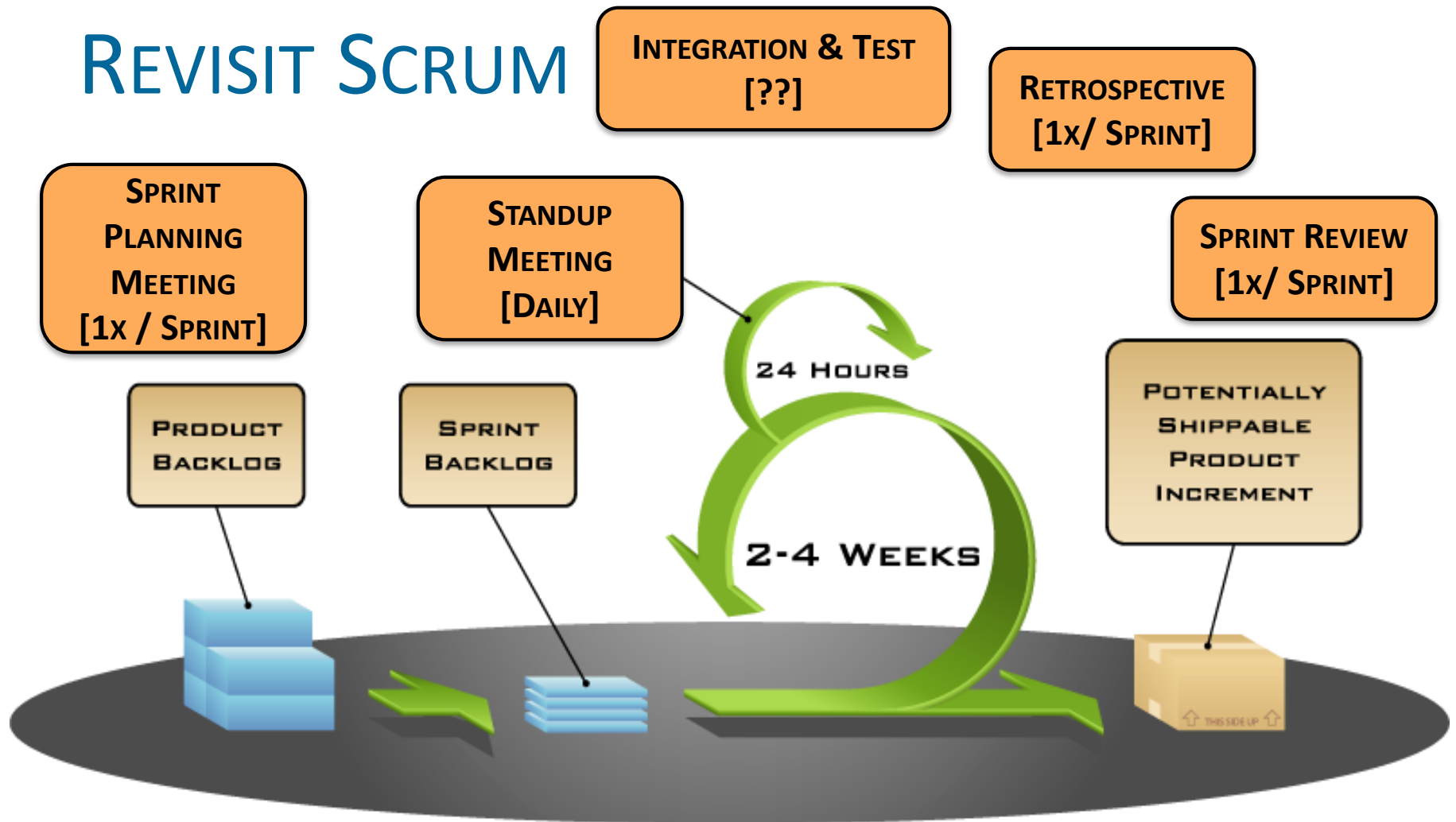
- Rework due to not getting earlier feedback from customer on whether features are satisfactory
- Extra effort to fix bugs because they weren't found earlier
- Lost sales due to not having the chance to change or add a feature

Holding Cost

- Cost of system integration and test
- Cost of holding sprint review meetings
- Final defect review & decision-making

Transaction Cost

REVISIT SCRUM



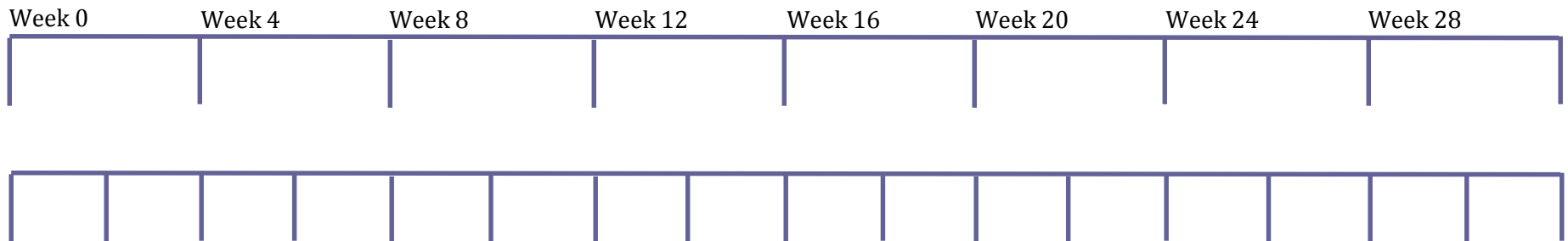
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What if some of these were not 1x/sprint?

ALIGN YOUR CADENCES

- Cadences for the same project should be multiples of each other
 - For instance, retrospective every other sprint



THE IMPORTANCE OF PREDICTABILITY

- The predictability of cadence is critical



THE BOTTOM LINE



- The best cadence is the one which minimizes the total cost
- Total cost is driven by both holding cost and transaction cost
- The “sweet spot” for total cost is usually broad and flat
- Moving the “sweet spot” may require an order-of-magnitude reduction in transaction cost

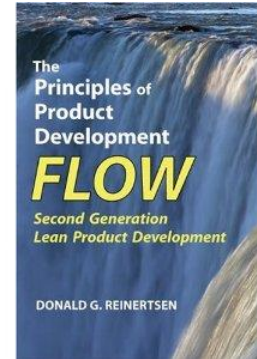
REFERENCES ON CADENCE

Everything you ever wanted to know about cadence:

The Principles of Product Development Flow: Second Generation

Lean Product Development

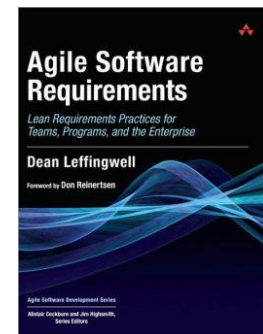
by Don Reinertsen



Cadence to coordinate large projects

Agile Software Requirements : Lean Requirements Practices for Teams, Programs, and the Enterprise

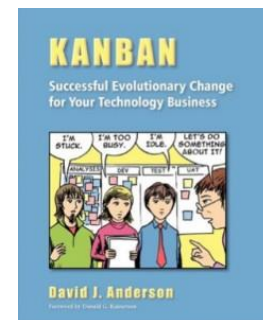
by Dean Leffingwell



Decoupling the Scrum cadences

Kanban: Successful Evolutionary Change for Your Technology Business

by David J. Anderson



Thank You!

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www.kiberle.com/articles

Learn more about cadence at
www.kiberle.com/links



PNSQC 2013 Invited Speaker: *Lean in the Test Lab: The Potential for Big Improvements*
Workshop on Wednesday, October 16 – Lean in the Test Lab – Work Smarter, Not Harder