CD3 - COST OF DELAY DIVIDED BY DURATION

TECHNIQUE

Cost of Delay Divided by Duration (CD3) is a technique used to determine the optimal prioritisation for ideas, projects, features and work items. It applies whenever there is limited capacity to deliver, which is typical in software. It is a form of Weighted Shortest Job First (WSJF), where the weighting is by Cost of Delay.

$$\text{CD3} = \frac{\text{Cost of Delay}}{\text{Duration}}$$

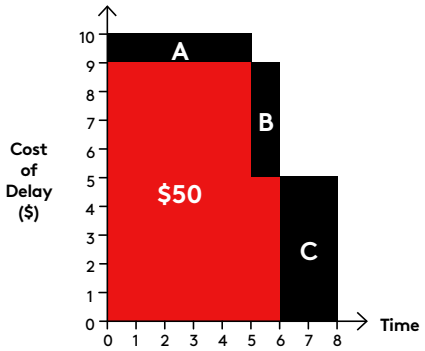
One of the main benefits of CD3 is that it permits us to use a common measure to compare opportunities with different value and urgency, and where the duration differs. CD3 optimises the return on investment by minimising the delay cost. In most product development settings, development capacity is difficult to scale, which makes the amount of time that this limited pipeline is blocked of critical importance.

Because CD3 uses Duration on the denominator, it also has the benefit of encouraging the breakdown of work into smaller batches – one of the easiest and most powerful improvements we can make in terms of getting more value, faster flow and better quality.

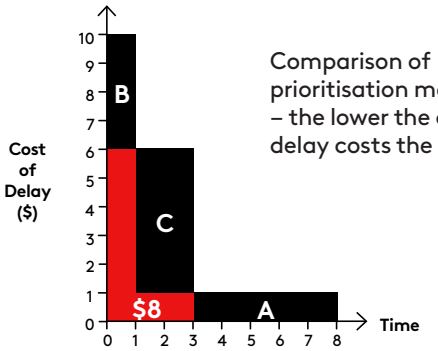
Below is an example to demonstrate why CD3 works:

Feature	Cost of Delay	Duration (weeks)	CD3 score
A	$1/week	5	0.2
B	$4/week	1	4
C	$5/week	2	2.5

Three features with different Cost of Delays and Durations



FIRST IN FIRST OUT (FIFO)



COST OF DELAY DIVIDED BY DURATION (CD3)

Comparison of prioritisation methods – the lower the overall delay costs the better

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Implementation

Prerequisite

The main pre-requisite is an estimate of the Cost of Delay and an estimate of the Duration.

To compute CD3 score:

1. Estimate the Cost of Delay for each feature (See description in the Cost of Delay Technique Library).
2. Estimate Duration that each feature would take (end-to-end).
3. For each feature divide the Cost of Delay by the Duration.
4. Order the features from highest CD3 score to lowest CD3 score.

For the previous example, we have included the calculations below based on each method:

FIRST IN FIRST OUT (FIFO) METHOD

While you're delivering A, you incur the cost of delay of B + C
Cost of Delay: B + C = $4 + $5 = $9
Duration of A = 5
Therefore Cost of Delay for B + C during delivery of A is $9 x 5 = $45
Then: while you're delivering B, you incur the Cost of Delay of C
Cost of Delay: C = $5
Duration of B = 1
Therefore Cost of Delay for C during delivery of B is $5 x 1 = $5
Total Cost of Delay = $50

COST OF DELAY DIVIDED BY DURATION (CD3) METHOD

While you're delivering B, you incur the cost of delay of C+A
Cost of Delay: C+A= $5 + $1= $6
Duration of B = 1
Therefore Cost of Delay for C+A during delivery of B is $6 x 1 = $6
Then: while you're delivering C, you incur the cost of delay of A
Cost of Delay: A = $1
Duration of C = 2
Therefore Cost of Delay for A during delivery of C is $1 x 2 = $2
Total Cost of Delay = $8

Potential pitfalls

- Don't be tempted to try to uncover a perfect 'precise' figure when estimating the Cost of Delay or the Duration. You don't know what you don't know. Make the best with what you have and state the assumptions you've had to make where you don't have data.
- Don't hide the data behind the score – making these visible will reduce errors in estimates or gaming of the system.
- CD3 is for scheduling, not for working out whether a feature is worth doing or not.
- CD3 score is not transferable between teams (although Cost of Delay is and should be).
- CD3 scores are irrelevant once a feature has been pulled into development. From that point it is the Cost of Delay that matters and should be used to help the team make the correct trade-off decisions. If you're tempted to switch to a feature with a higher CD3 score then your cycle-time is probably too long.

If you want to learn more, consider reading:
The Principles of Product Development Flow by Donald Reinertsen