

## SE-441 Continuous Delivery and DevOps

Winter 2018-2019

### Homework 1

Fernando Araujo

1. [15 points] Suppose our organization does 24 deployments per year of a particular service. Suppose that 10% of them cause an average of 8 hours of downtime and another 15% of them cause an average of 2 hours of downtime. Each hour of downtime costs us \$25,000.

a. How much is the downtime costing the organization annually?

$$24 \times .10 \times 8 \times 25,000 = 480,000$$

$$24 \times .15 \times 2 \times 25,000 = 180,000$$

$$480,000 + 180,000 = 660,000$$

**The downtime is costing the organization a total of \$660,000 annually**

b. Suppose management has set a new goal for the year of reducing the cost of our downtime to \$250,000. They like the pace at which new features are delivered so they don't want to reduce the number of deployments, but they want them to be much more reliable.

What change failure rates (rounded to the nearest tenth of a percent) do we need to reach in order to achieve this goal? *Hint: Maintain the relative frequencies of the bigger and smaller change failure rates. In other words that the longer failures make up 40% of all failures and the shorter ones the remaining 60%.*

$$(24 \times Y(.4) \times 8 \times 25,000) + (24 \times Y(.6) \times 2 \times 25,000) = 250,000$$

$$(24 \times Y(.4) \times 8) + (24 \times Y(.6) \times 2) = 10$$

$$(Y(.4) \times 8) + (Y(.6) \times 2) = 0.41666$$

$$(.4Y \times 4) + .6Y = 0.20833$$

$$2.2Y = 0.20833$$

$$Y = 0.09469$$

$$0.09469 \times .4 = 0.03787$$

$$0.09469 \times .6 = 0.056818$$

$$24 \times 0.038 \times 8 \times 25,000 = 182,400$$

$$24 \times 0.057 \times 2 \times 25,000 = 68,400$$

**Total = \$250,800** (over 800 dollars due to rounding)

**Longer Failures Rate = 3.8%**

**Shorter Failures Rate = 5.7%**

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2. [10 points] Your software engineering director estimates that the division is spending an excess of 8% of its time on rework. The division is made up of 250 technical staff making an average of \$80,000 per year with a benefits multiplier of 1.4.

a. What is the annual cost of that excess re-work?

$$250 \times 80,000 \times 1.4 \times .08 = \$2,240,000$$

**Annual Cost of Excess Rework = \$2,240,000**

b. Your director wants to reduce the division's annual cost of rework by \$500,000. His preferred approach is to reduce the percentage of excess rework. What must the excess rework percentage be to meet your director's target?

$$\$2,240,000 - \$500,000 = \$1,740,000$$

$$250 \times 80,000 \times 1.4 \times Y = 1,740,000$$

$$28,000,000 \times Y = 1,740,000$$

$$Y = .06214$$

**Excess Rework Percentage = 6.2%**