# Ski Lift Case Study

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# Ski Park

Skiers always wait in the queue for a ski lift, they ride the ski lift up the mountain, and ski down the slopes; repeat. The total number of skiers in the park is always constant across any one of these locations:

1. Queue
2. Lift
3. Slopes

# Problem

Skiers experiencing long queues waiting for a ski lift.

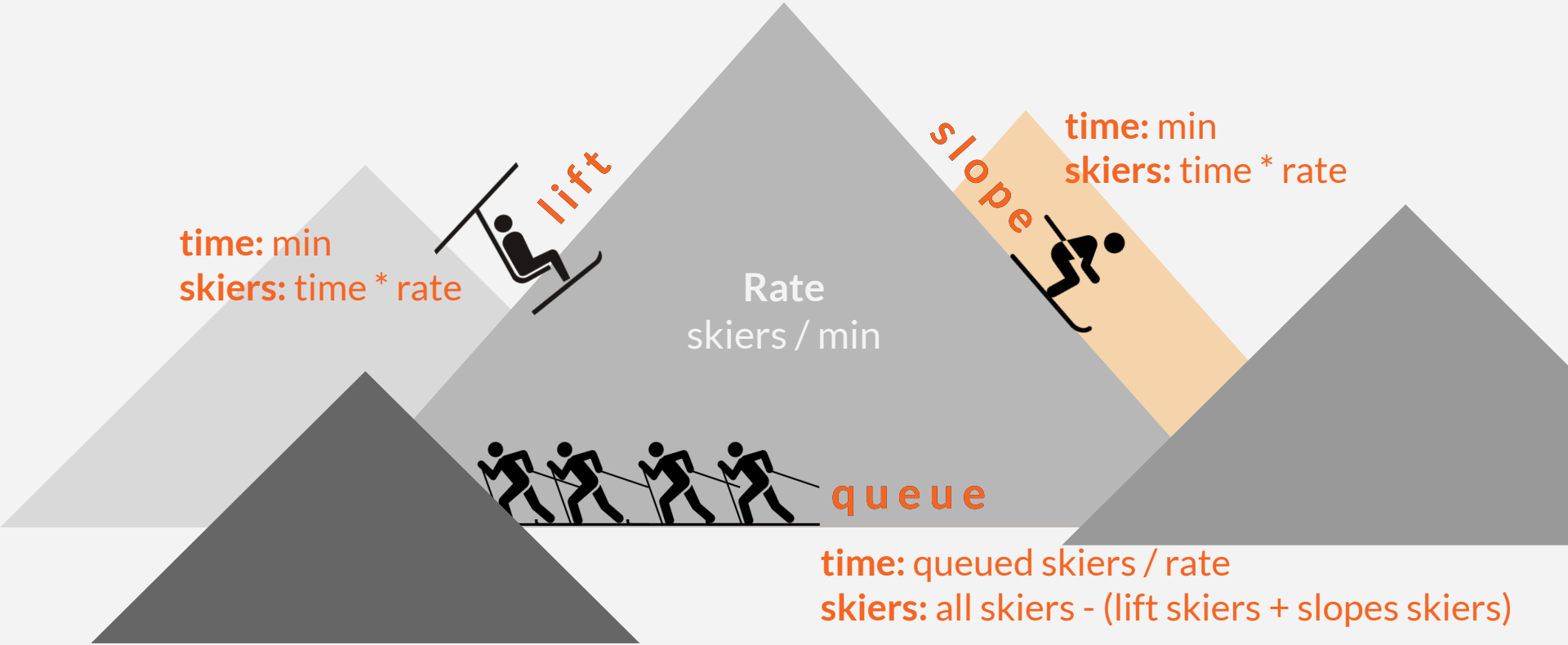
# Objective

Reduce amount of time customers spend waiting for a ski lift.

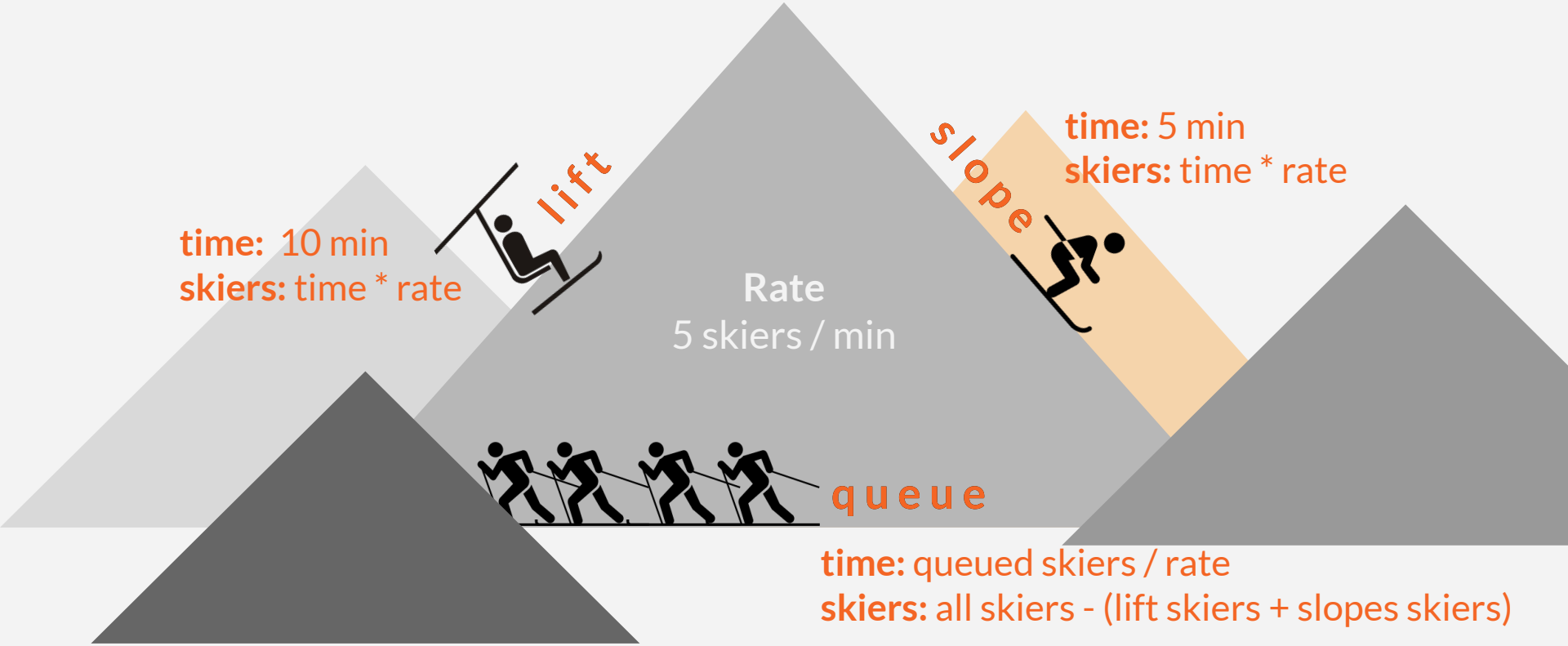
# Variables

1. Number of skiers at location
2. Time at location

# Mountain Metrics



# Existing Lift



| Existing Ski Lift | | | |
|---|---|---|---|
| Location | Rate | Time | Skiers |
| Lift | 5 skiers / min | 10 min | Time * Rate |
| Slopes | | 5 min | Time * Rate |
| Queue | | skiers / rate | all skiers - (lift skiers + slopes skiers) |

| Existing Ski Lift | | | |
|---|---|---|---|
| Location | Rate | Time | Skiers |
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| Existing Ski Lift | | | |
|---|---|---|---|
| Location | Rate | Time | Skiers |
| Lift | 5 skiers / min | 10 min | 10 min * 5 skiers / min = 50 skiers |
| Slopes | | 5 min | 5 min * 5 skiers / min = 25 skiers |
| Queue | | skiers / rate | all skiers - (lift skiers + slopes skiers) |

| Existing Ski Lift | | | |
|---|---|---|---|
| Location | Rate | Time | Skiers |
| Lift | 5 skiers / min | 10 min | 50 skiers |
| Slopes | | 5 min | 25 skiers |
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| Lift | 5 skiers / min | 10 min | 50 skiers |
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| Queue | | skiers / rate | all skiers - (lift skiers + slopes skiers) |

| Existing Ski Lift | | | |
|---|---|---|---|
| Location | Rate | Time | Skiers |
| Lift | 5 skiers / min | 10 min | 50 skiers |
| Slopes | | 5 min | 25 skiers |
| Queue | | skiers / rate | all skiers - (25 skiers + 50 skiers) |

| Existing Ski Lift | | | |
|---|---|---|---|
| Location | Rate | Time | Skiers |
| Lift | 5 skiers / min | 10 min | 50 skiers |
| Slopes | | 5 min | 25 skiers |
| Queue | | skiers / rate | all skiers - (75 skiers) |

| Existing Ski Lift | | | |
|---|---|---|---|
| Location | Rate | Time | Skiers |
| Lift | 5 skiers / min | 10 min | 50 skiers |
| Slopes | | 5 min | 25 skiers |
| Queue | | skiers / rate | (skiers - 75 skiers) |

| Existing Ski Lift | | | |
|---|---|---|---|
| Location | Rate | Time | Skiers |
| Lift | 5 skiers / min | 10 min | 50 skiers |
| Slopes | | 5 min | 25 skiers |
| Queue | | skiers / rate | (skiers - 75 skiers) |

| Existing Ski Lift | | | |
|---|---|---|---|
| Location | Rate | Time | Skiers |
| Lift | 5 skiers / min | 10 min | 50 skiers |
| Slopes | | 5 min | 25 skiers |
| Queue | | $\frac{\text{(Skiers - 75)}}{\text{5 skiers / min}}$ | (skiers - 75 skiers) |

| Existing Ski Lift | | | |
|---|---|---|---|
| Location | Rate | Time | Skiers |
| Lift | 5 skiers / min | 10 min | 50 skiers |
| Slopes | | 5 min | 25 skiers |
| Queue | | $\frac{(\text{skiers} - 75)}{5}$ | (skiers - 75 skiers) |

| Existing Ski Lift | | | |
|---|---|---|---|
| Location | Rate | Time | Skiers |
| Lift | 5 skiers / min | 10 min | 50 skiers |
| Slopes | | 5 min | 25 skiers |
| Queue | | $\frac{(\text{skiers} - 75)}{5}$ | (skiers - 75 skiers) |

| Faster Ski Lift | | | |
|---|---|---|---|
| Location | Rate | Time | Skiers |
| Lift | 5 skiers / min | 5 min | Time * Rate |
| Slopes | | 5 min | Time * Rate |
| Queue | | skiers / rate | all skiers - (lift skiers + slopes skiers) |

| Second Ski Lift | | | |
|---|---|---|---|
| Location | Rate | Time | Skiers |
| Lift | 10 skiers / min | 10 min | Time * Rate |
| Slopes | | 5 min | Time * Rate |
| Queue | | skiers / rate | all skiers - (lift skiers + slopes skiers) |

| Faster Ski Lift | | | |
|---|---|---|---|
| Location | Rate | Time | Skiers |
| Lift | 5 skiers / min | 5 min | Time * Rate |
| Slopes | | 5 min | Time * Rate |
| Queue | | skiers / rate | all skiers - (lift skiers + slopes skiers) |

| Second Ski Lift | | | |
|---|---|---|---|
| Location | Rate | Time | Skiers |
| Lift | 10 skiers / min | 10 min | Time * Rate |
| Slopes | | 5 min | Time * Rate |
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| Location | Rate | Time | Skiers |
| Lift | 5 skiers / min | 5 min | Time * Rate |
| Slopes | | 5 min | Time * Rate |
| Queue | | skiers / rate | all skiers - (lift skiers + slopes skiers) |

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|---|---|---|---|
| Location | Rate | Time | Skiers |
| Lift | 10 skiers / min | 10 min | Time * Rate |
| Slopes | | 5 min | Time * Rate |
| Queue | | skiers / rate | all skiers - (lift skiers + slopes skiers) |

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|---|---|---|---|
| Location | Rate | Time | Skiers |
| Lift | 5 skiers / min | 5 min | Time * Rate |
| Slopes | | 5 min | Time * Rate |
| Queue | | skiers / rate | all skiers - (lift skiers + slopes skiers) |

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| Location | Rate | Time | Skiers |
| Lift | 10 skiers / min | 10 min | Time * Rate |
| Slopes | | 5 min | Time * Rate |
| Queue | | skiers / rate | all skiers - (lift skiers + slopes skiers) |

| Faster Ski Lift | | | |
|---|---|---|---|
| Location | Rate | Time | Skiers |
| Lift | 5 skiers / min | 5 min | 5 min * 5 skiers / min = 25 |
| Slopes | | 5 min | 5 min * 5 skiers / min = 25 |
| Queue | | skiers / rate | all skiers - (lift skiers + slopes skiers) |

| Second Ski Lift | | | |
|---|---|---|---|
| Location | Rate | Time | Skiers |
| Lift | 10 skiers / min | 10 min | 10 min * 10 skiers / min = 100 |
| Slopes | | 5 min | 5 min * 10 skiers / min = 50 |
| Queue | | skiers / rate | all skiers - (lift skiers + slopes skiers) |

| Faster Ski Lift | | | |
|---|---|---|---|
| Location | Rate | Time | Skiers |
| Lift | 5 skiers / min | 5 min | 25 |
| Slopes | | 5 min | 25 |
| Queue | | skiers / rate | skiers - (25 + 25) |

| Second Ski Lift | | | |
|---|---|---|---|
| Location | Rate | Time | Skiers |
| Lift | 10 skiers / min | 10 min | 100 |
| Slopes | | 5 min | 50 |
| Queue | | skiers / rate | all skiers - (100 + 50) |

| Faster Ski Lift | | | |
|---|---|---|---|
| Location | Rate | Time | Skiers |
| Lift | 5 skiers / min | 5 min | 25 |
| Slopes | | 5 min | 25 |
| Queue | | (skiers - 50) / 5 | 50 |

| Second Ski Lift | | | |
|---|---|---|---|
| Location | Rate | Time | Skiers |
| Lift | 10 skiers / min | 10 min | 100 |
| Slopes | | 5 min | 50 |
| Queue | | (skiers - 150) / 10 | 150 |

| Ski Lift Comparison | | | |
|---|---|---|---|
| Option | Rate | Time | Wait Time |
| Existing | 5 skiers / min | 10 min | (skiers - 75) / 5 |
| Faster | 5 skiers / min | 5 min | (skiers - 50) / 5 |
| Second | 10 skiers / min | 10 min | (skiers - 150) / 10 |

| Ski Lift Comparison | | | |
|---|---|---|---|
| Option | Rate | Time | Wait Time |
| Existing | 5 skiers / min | 10 min | y = 0.2x - 15 |
| Faster | 5 skiers / min | 5 min | y = 0.2x - 10 |
| Second | 10 skiers / min | 10 min | y = 0.1x - 15 |

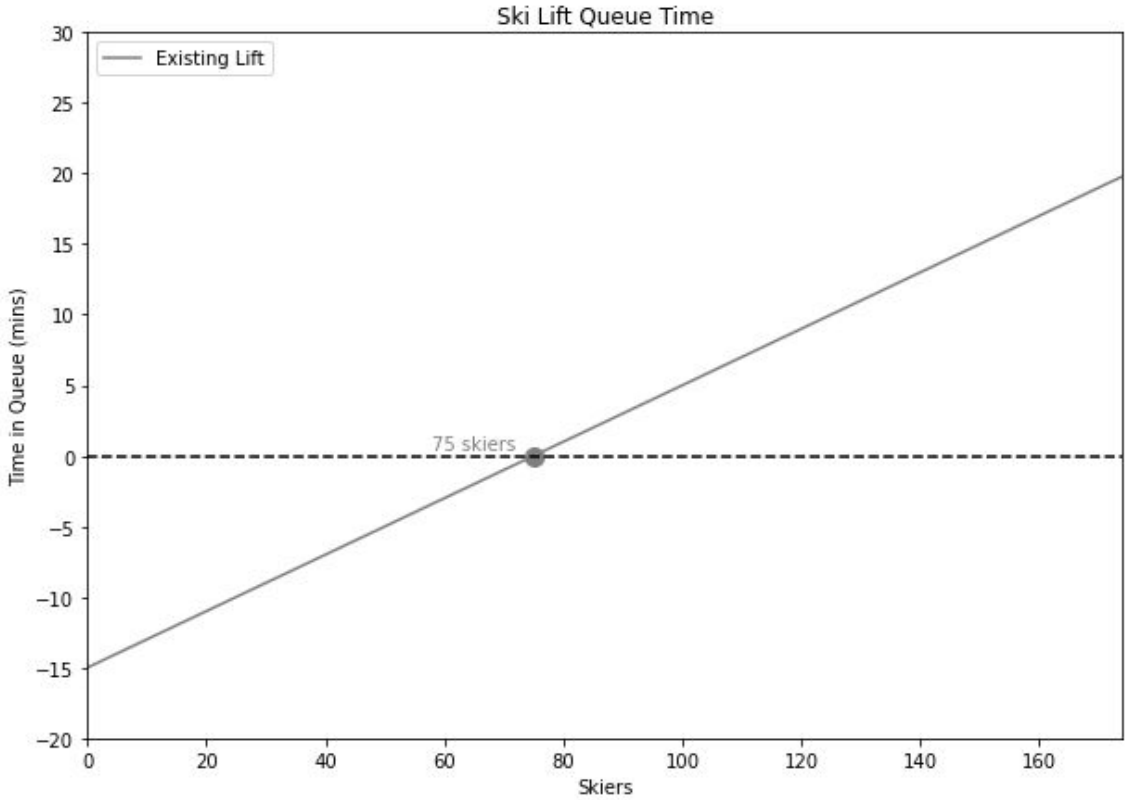
| Ski Lift Comparison | | | |
|---|---|---|---|
| Option | Rate | Time | Wait Time |
| Existing | 5 skiers / min | 10 min | y = 0.2x - 15 |
| Faster | 5 skiers / min | 5 min | y = 0.2x - 10 |
| Second | 10 skiers / min | 10 min | y = 0.1x - 15 |

x = total skiers
y = wait time for lift

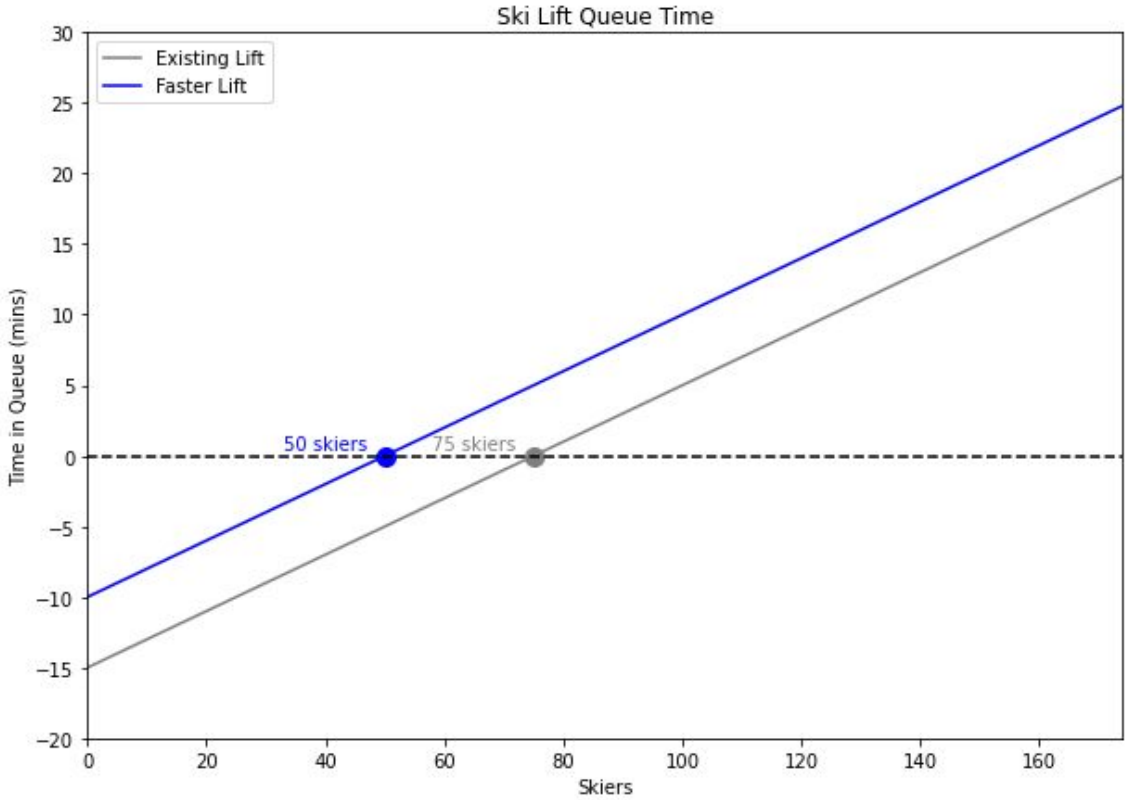
| Ski Lift Comparison | |
|---|---|
| Option | Wait Time |
| Existing | y = 0.2x - 15 |
| Faster | y = 0.2x - 10 |
| Second | y = 0.1x - 15 |

x = total skiers
y = wait time for lift

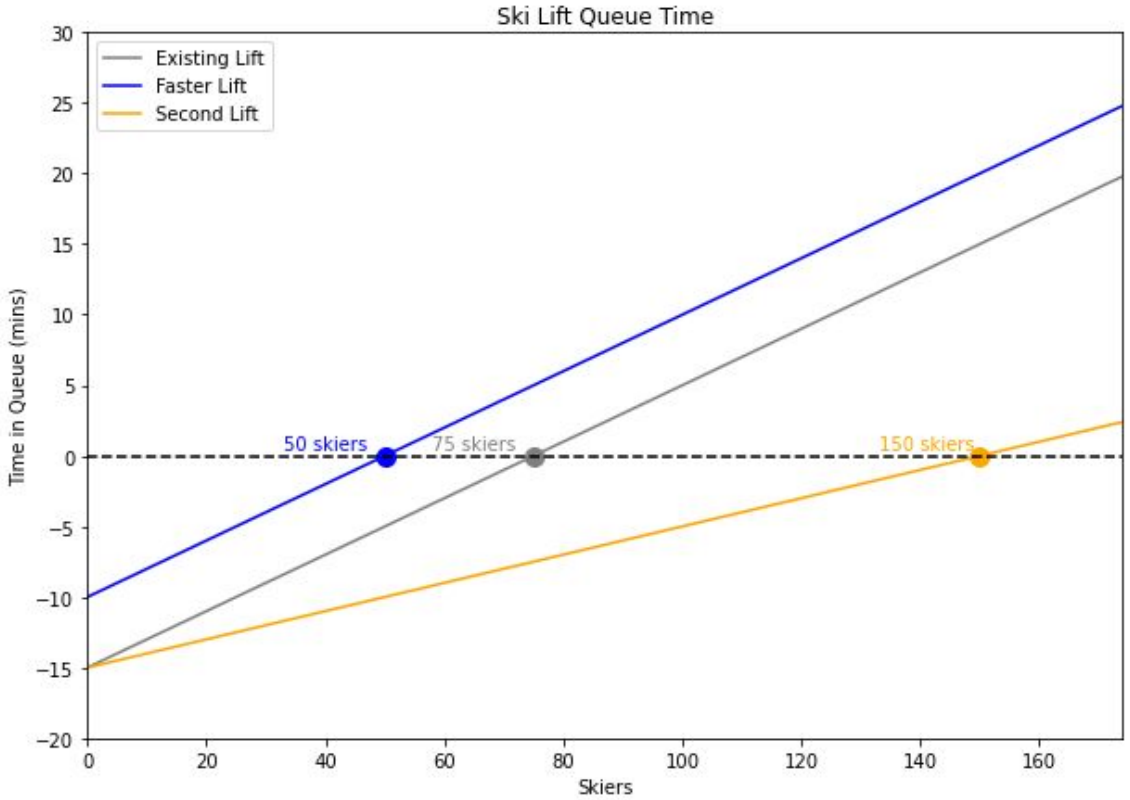
| Ski Lift Comparison |
| --- |
| Option |
| Existing |
| Faster |
| Second |



| Ski Lift Comparison |
| --- |
| Option |
| Existing |
| Faster |
| Second |



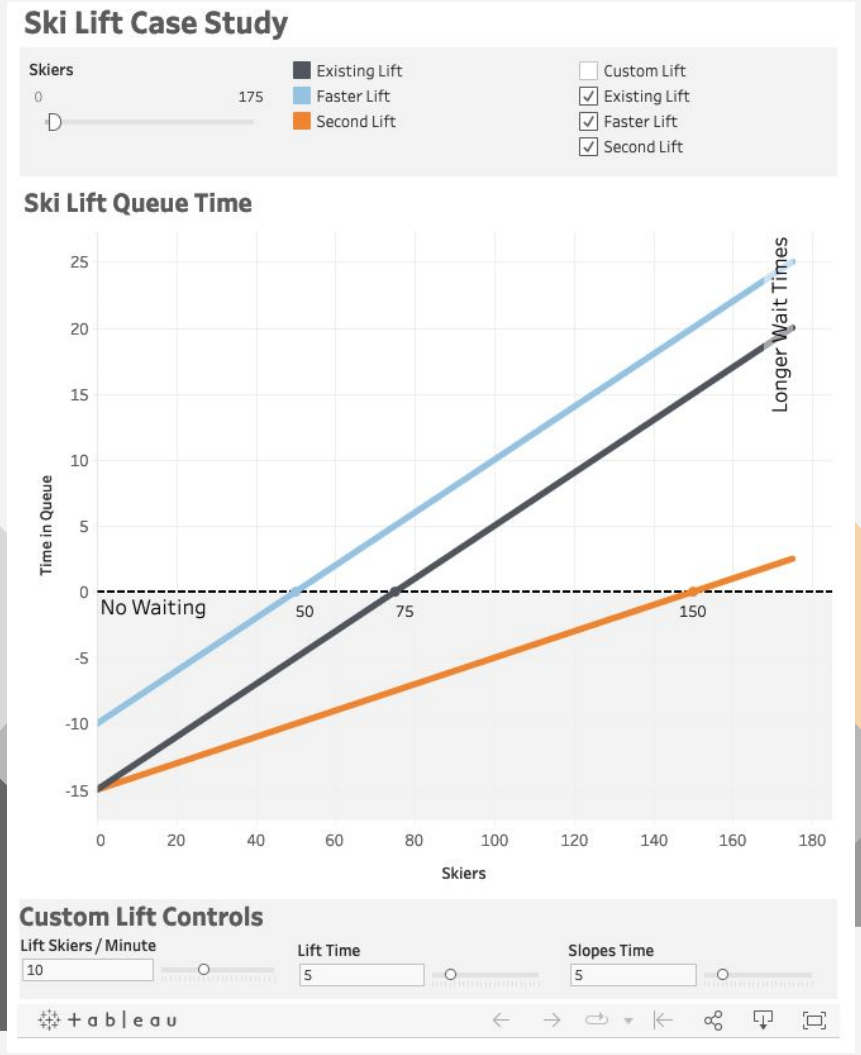
| Ski Lift Comparison |
| --- |
| Option |
| Existing |
| Faster |
| Second |



# Recommendation

Adding a **second lift** will **reduce wait times** in the queue the most.

# Explore


Ski Lift Case Study
Skiers
0
175
Existing Lift
Faster Lift
Second Lift
Custom Lift
Existing Lift
Faster Lift
Second Lift
Ski Lift Queue Time
Longer Wait Times
Time in Queue
25
20
15
10
5
0
-5
-10
-15
No Waiting
50
75
150
0
20
40
60
80
100
120
140
160
180
Skiers
Custom Lift Controls
Lift Skiers / Minute
10
Lift Time
5
Slopes Time
5
+ableau

# Discussion - Second Lift

- Relative to a faster lift, additional time is spent sitting on a lift chair traveling up the mountain.
  - Is this better?
- Skiers may avoid long lines during peak hours by spending more time in the lodge gift shop or dining at the restaurant.
- How much does a second ski lift cost?
  - Is loss from customer churn greater than the construction cost, staff to operate, and maintenance for a new lift?
- Will slopes time descending the mountain be identical for both lifts?

# Discussion - Existing Lift, Adjusted

- Does risk of injury increase when speeding up the ski lift?
- Are less experienced skiers more likely to be intimidated by the increase in speed?
- Will additional maintenance be required?
  - Will down time increase due to additional maintenance?
- Will the rate of skiers reaching the peak double due to the increase in speed?
- Would shorter wait times from slowing down the existing lift accomplish the same objective?
- On days where wait times will always be 0, would increasing lift speed increase enjoyment for high volume skiers?

# thank you!

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