To: Management team of XXX Airline
From: Yidi Geng, Operation Analyst
Date: March 1, 2022
Subject: Assessment of delayed flights

To whom it may concern,

It has come to our attention that some of our flight routes are having delays issues. From this memo together with the attached Excel file, you will find my answers for your specific questions, covering flight routes that are most problematic for the airline in terms of departure delays and the reasons for the delays.

On the separate worksheet called “Q1”, I created a short cut to pull out some key data from the original report. If you press “Control+Shift+A” or just click the button, you will get the flight number, the route, the actual departure delay time, the flight time, the carrier delay time, and the weather delay time of each flight. Please note that all delay times are in minutes.

On the separate worksheet called “Q2”, you will find a PivotTable and a column PivotChart that visualizes the average time of each type of delay in each region. Form this sheet, you can easily find that the average time of actual departure delay, carrier delay, weather delay, security delay, and late aircraft delay are about the same in the South as they are in the North. Whereas the average time of national air system delay in the South is 44.4% shorter than the North. Both regions have more than 50 mins of actual delay. And if we case back to the root cause of these delays, you can clearly find that the weather and security reason are not problematic issues. However, major of the actual delay are contributed by delay in carrier and the late of the previous aircraft. Therefore, finding the right solution to shorter these two types of delays is important.

On the separate worksheet called “Q3a” and “Q3b”, you will find the average time of actual departure delay of each flight. The first column indicates region of each flight. The second column indicates the flight’s departure airport. And the third column shows the destination airport of each flight. From the pivot table on the “Q3a” worksheet, it is easy to find that in terms of the average departure delay for flights categorized under ‘Extremely Delayed’, the top 3 routes (highlighted in red) in the North region are DTW-ALT, PHL-DFW, and DTW-GRR. They have average of actual departure delay of 524.5 mins, 494.5 mins, and 369m mins accordingly. The top 3 routes (highlighted in yellow) that has the heavyset delay in the South region are DFW-HSV, PHX-JFK, and PHX-PDX, with 738 mins, 705.5mins, and 553 mins of the average of actual departure delays. Even though the average of actual departure delay of the North is close to the delay in the South region, the total delay of top 3 routes of these two regions has a huge gap. Therefore, it is urgent for us to find out the causes of the extremely delay flights in South Region and solve it as soon as possible.

On the separate worksheet called “Q3b”, it is not difficult to find out that the three most frequently early departure flights (highlighted in red) in the North regions are PHL-LAX (24 times of early departure), PHL-SFO (11 times of early departure), PHL-ALT (11 times of early departure), SEA-LAX (11 times of early departure), and SEA-ORD (11 times of early departure). Three of these routes are departure from PHL, and the rest two are originate from SEA. In the South region. The three most frequently early departure flights (highlighted in yellow) are FLL-ATL (10 times), DFW-ORD (8 times), DFW-IAH (6 times), DFW-DEN (6 times), and FLL-DFW (6 times). It is interesting to find that, like North region, the most frequently early departure flights concentrate at two airports again. Link back to the extremely delay issue I analyzed in

the worksheet “Q3a”, I suggested that management teams should visit the PHL, SEA, DFW, and FLL airport to learn why flights can departure early than scheduled at these airports. This should help you find ways to effectively reduce delays.

The separate worksheet “Q4” focuses more on one the five types of delays – carrier delay. You will find the percentage of the total delay that is attributable to the airline (i.e., percentage of carrier delay) in column D of each flight. It is equal to the sum of carrier delay (find in column E) of each route divided by the sum of five delays (find in Column F) of that route. The three routes in North region (i.e., ORIGIN -> DEST) that have the highest percentage of carrier delay are DTW-CAE (100%), FNT-TPA (99.47%), and DTW-LEX (96.67%). Two out of three happened at DTW airport. Therefore, it is reasonable to assume that there must be some issues with some of the pre-departure processes, such as, aircraft emergency maintenance, crew deployment, luggage delay, or aircraft refueling. The management team should conduct further investigations there. The top three routes in South region are DFW-ACT (100%), PHX-MSY (98.18%) and DFW-FSM (96.15%). Similar case as the North region, two out of three routes originate from DFW airport. However, it is not urgent for management team to investigate DFW. As mentioned before, DFW has an outstanding performance in early departure. Therefore, although the carrier delay is the major issue of DFW, it doesn’t cause a serious impact.

The last but not the least, you will find a button next to the “column N” of the worksheet called “Regions Data”. This is the button to generate the ad-hoc report you asked. Please notice that all flight number in green font indicates that this flight’s carrier and weather delays altogether is less than 45 minutes. All the flight with a bold Origin font is the flight with carrier and weather delays altogether more or equal to 45 minutes.

Thank you,
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