Decision Engine (**Nathan Lutz**)

The Decision Engine will provide the backend logic to the frontend Web App Engine. The following functional requirements shall be met:

Ridership Reports & Trends

1. Provide an interface for the Web Application Engine to request a ridership report on the past.
   1. The request must contain valid date (MM-DD-YYYY), station ID and time range.
   2. It will query the Current ITS database for number of departures and arrivals during the specified date&time range.
   3. It will return the data, non-negative integers.
2. Provide an interface for the Web Application Engine to request a ridership trend report on future dates.
   1. The request must contain valid date (MM-DD-YYYY), station ID and time range.
   2. It will query the Current ITS database for number of departures and arrivals during the same time range on past dates.
   3. It will predict the values of departures and arrivals for the future date range.
   4. The return values must be non-negative.

Delay Impact & Ontime Performance Reporting

1. Provide an interface for the Web Application Engine to request a Delay Impact report.
2. It will query the Current ITS database for the most recent simulated GPS location of active trains.
3. It will query the Current ITS database for past simulated arrival times at the station during the date and time range.
4. It will compare those values to the HRT schedule, and return the average variance.
5. It will query the Current ITS database for any active alerts, incorporating a delay severity level in its calculation of delay.
6. It will compare the expected value of time-to-arrival from the calculated variance and current GPS position to the HRT schedule and return the value of possible delay to each station, a time value.
7. Provide an interface for the Web Application Engine to request an Ontime Performance Report.
   1. The request must contain valid date (MM-DD-YYYY), station ID, and time range.
   2. It will query the Current ITS database for past simulated arrival times at the station during the date and time range.
   3. It will compare those values to the HRT schedule, and return the average variance, a time value.