developed by GM in what is known as the "Global B" architecture). While this is probably not an insurmountable challenge, it will take time and resources for other OEMs to catch up, possibly providing GM with a head start. And it is possibly beyond the capability of many Non-OEMs.

- **Connectivity/data** – We alluded to the advantage of having a large connected fleet for the development of Autonomous Driving AI. There are also other advantages that GM can bring to bear, which will be difficult for tech companies to replicate. For example, nearly all of the Industry's participants recognize that accurate digital map data will be required for localization, path planning, and redundancy. Companies such as Google have been collecting 3D map data through a small fleet of vehicles equipped with LIDAR scanning technology. This approach is expected to provide Google vehicles, or other vehicles that use Google's data with the ability to conduct Autonomous driving within specific geo-fenced areas that have been mapped. The challenge with 3D mapping is two fold: 1) Scaling, and 2) Time to reflect reality. 3D map data for 4MM miles of U.S. roads does not currently exist (note that ~30% of these roads are unpaved). Moreover, there is no mechanism currently available to update these maps in real time. GM has the most connected fleet in the world (100% of new vehicles sold in North America connected through OnStar). So they have the ability to gather data from millions of vehicles (even those that are not autonomous). Google and other tech startups would not be able to match this. If GM pursues crowd sourced data collection from millions of drivers, they may be amongst the first to market with Autonomous vehicles that are capable of driving almost everywhere (even outside of specific geo-fenced locations).

- **Vehicle ownership and service infrastructure** - Operating a network of robotaxis will not just involve deployment of robots. The vehicles will need to be cleaned, inspected, repaired, fueled, software/firmware updated, and parked (during off-hours), perhaps multiple times a day (the human operator that completes many of these tasks will not be present). With respect to maintenance, we'd note that these vehicles may accumulate 70,000 miles per year. A lifetime of service and parts will be required over the course of 3-years (the average life expectancy of a car today is approximately 210,000 miles). We believe that this will involve significant infrastructure investment. We see a number of entities vying for this role (e.g. dealers, car rental companies). But ultimately, GM may seek to do it themselves if they can achieve sufficient scale and efficiencies in major cities.

- **Mobility platform** - One of the key questions will be whether GM pursues development of a customer facing Transportation as a Service platform themselves (i.e. expansion of Maven into a broader On Demand Mobility platform), or whether GM will provide the back end (ownership/operation) for an existing platform (Vehicle Management as a Service on behalf of Lyft, Uber, Gett, or Didi). There are arguments in favor of both strategies. We suspect that GM may opt for greater vertical integration if they believe that their first mover advantage will allow them to disrupt and sustainably grow a major mobility business. The alternative is to go through existing providers such as Lyft, if they believe that Lyft's knowhow (i.e. consumer interaction, pricing, logistics/efficiency, licensing) provides value, or if they believe that the front end ultimately gets squeezed by data aggregators such as Google (e.g.