Once you have got the data integration right, some of the key questions that need to be answered to implement this solution are as follows:

- First of all identify which are the Top 50 SKUs with highest field failure rate and are contributing to 80% of warranty cost. The challenge is master data here, matching SKU serial numbers coming from repair centers to corporate master data (need to have strong process of master data management and data governance)
- Once SKU's are identified, a particular SKU may have one million units (serial numbers) that have failed over the years in market
  - Find out which factories they were manufactured in (complexity is to map serial number back to manufacturing unit)
  - Find out Top 10 failure causes, symptoms and components
  - Identify top 10 components which are failing for a particular SKU
- Once SKU or group of SKU is mapped to manufacturing unit, identify the manufacturing process history and Bill of Material used at the time of manufacturing(complexity is in data access for each serial number failed for a specific SKU and having access to BOM, as BOM for the same SKU may have changed over time)
- After accessing data, it is important to find patterns for component failures which has caused high field failure rate, there can be several reasons for high FFR (field failure rates)
  - May be within specific batch, component supplied by specific vendor was faulty or of lower quality than prescribed guidelines (complexity is mapping component to vendor, as same components may be supplied by multiple vendors)
  - May be all serial number in batch with same supplier component has passed QC test but with border line cases and started to fail in market on extreme conditions
  - May be it is a design defect
  - May be it is workmanship or placement defects

It is big & complex data integration, incorporation of business logic, master data management and application of data science that collectively constitute the problem statement. The diagram below depicts typical architecture of GrayMatter's Manufacturing Analytics (MA+) Solution.
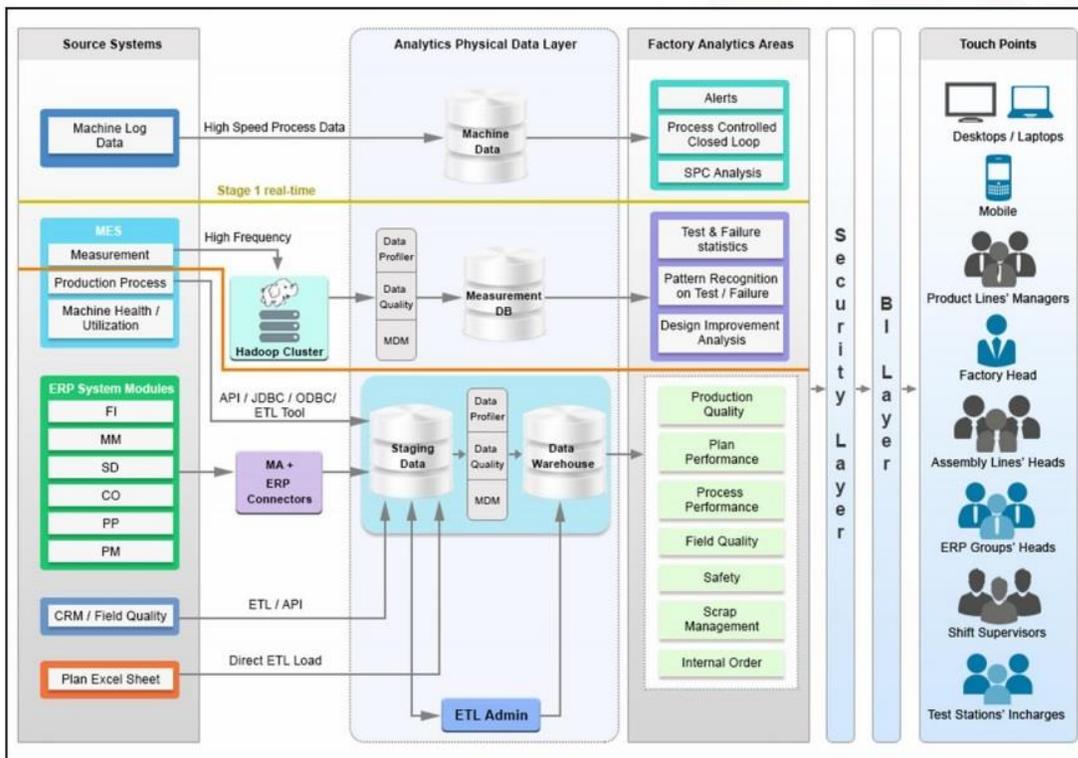
This use case also unravels another key benefit which is enhancement in manufacturing quality and hence reduction in cost of rework. The analysis also provides the ability to identify the specific SKU serial numbers which are affected, thereby enabling precision in recalling the specific batches of products. Such precision not only reduces effort and cost in identifying affected batches but also makes the recall from the market swift and well in time.