3. The most detailed grain is the combination of individual product or service, individual customer, and date (for special events, only customer and date).

- 50000 members: sum of member rows
- 350 franchises: sum of franchises
- 450,000 items sold merchandises (Contains rows) per year
- 500 Unique merchandise items
- 100,000 ServicePurchase rows per year
- 20 Unique ServCategory rows
- 300 SpecialEvents Worksheet rows per year per franchise with 200 franchises using this spreadsheet
- 150 unique customers per special event worksheet
- Merchandise Product sales(item level): 450,000
- Days per year: 365
- Customer number (product) = 50000
- Customer number (service) = 50000
- Customer number (special event) = 200*150=30000
- Fact table size (merchandize product sales) is determined - 450000 purchases per year (including merchandise product)
- Fact table size (service sales) is determined - 100000 purchases per year (including service)
- Fact table size (special event sales) is determined - 300*200=60000 purchases per year (including special events)
- Sparsity estimate:
  - 1 - (fact table size / product of dimensions)
  - (1 – (450000 / (500*50000*365)) = 0.9995
  - The data cube has mostly missing cells with slightly more than 0.0005% of cells with non-zero values.

  - 1 - (fact table size / service of dimensions)
  - (1 – (100000 / (20*50000*365)) = 0.997
  - The data cube has mostly missing cells with slightly more than 0.003% of cells with non-zero values.

  - 1 - (fact table size / special events of dimensions)
  - (1 – (60000 / (30000*365)) = 0.995
  - The data cube has mostly missing cells with slightly more than 0.005% of cells with non-zero values.