Hillard's Graph Complexity

- Calculation of metrics for frequent flyer example.

- Reference: Robert Hillard. Information-Driven Business. Hoboken, New Jersey: John Wiley, 2010.

Hillard Metrics for the Frequent Flyer Model

- Order – 11 – the count of tables.
- Size – 12 – 10 relationship types + 2 for supertype to subtype.
- Degree – the number of edges per node. Examples…
  FrequentFlyerAccount – 4
  FlightActivity – 2
  Activity – 4

Hillard Metrics for the Frequent Flyer Model

- Geodesic distance – minimum number of edges to connect a pair of nodes. Examples…
  FrequentFlyerAccount to Customer – 1
  FrequentFlyerAccount to FlightActivity – 2
  MonthlyStatement to Company – 4

Hillard Metrics for the Frequent Flyer Model

- Average degree
  FrequentFlyerAccount – 4, Customer – 1,
  Airline – 3, Airline_AirlinePartnership – 2,
  MonthlyStatement – 2, Activity – 4,
  AirlinePartnership – 1, Flight – 2,
  FlightActivity – 2, OtherActivity – 2, Company – 1
  Average = 4+1+3+2+2+4+1+2+2+2+1 / 11 = 24/11 = 2.2

Geodesic Distance

	FFA	Cust	Aline	A_AP	MS	Act	AP	Flt	FA	OA	Cmp
FFA	XXX	1	1	2	1	1	3	2	2	2	3
Cust	1	XXX	2	3	2	2	4	3	3	3	4
Aline	1	2	XXX	1	2	2	2	1	2	3	4
A_AP	2	3	1	XXX	3	3	1	2	3	4	5
MS	1	2	2	3	XXX	1	4	3	2	2	3
Act	1	2	2	3	1	XXX	4	2	1	1	2
AP	3	4	2	1	4	4	XXX	3	4	5	6
Flt	2	3	1	2	3	2	3	XXX	1	3	4

Geodesic Distance

	FFA	Cust	Aline	A_AP	MS	Act	AP	Flt	FA	OA	Cmp
FA	2	3	2	3	2	1	4	1	XXX	2	3
OA	2	3	3	4	2	1	5	3	2	XXX	1
Cmp	3	4	4	5	3	2	6	4	3	1	XXX

Average Geodesic Distance

- 1+1+2+1+1+3+2+2+2+3+
  2+3+2+2+4+3+3+3+4+
  1+2+2+2+1+2+3+4+
  3+3+1+2+3+4+5+
  1+4+3+2+2+3+
  4+2+1+1+2+
  3+4+5+6+
  1+3+4+
  2+3+
  1 = 139 / 55 = 2.5

Data Model Graph Assessment Criteria

- Average geodesic distance * Average degree / 3 <= 4
  The data model is relatively easy to read and navigate.
- 4 < Average geodesic distance * Average degree / 3 < 10.
  The data model is complex.
- 10 <= Average geodesic distance * Average degree / 3.
  The data model is effectively unworkable.