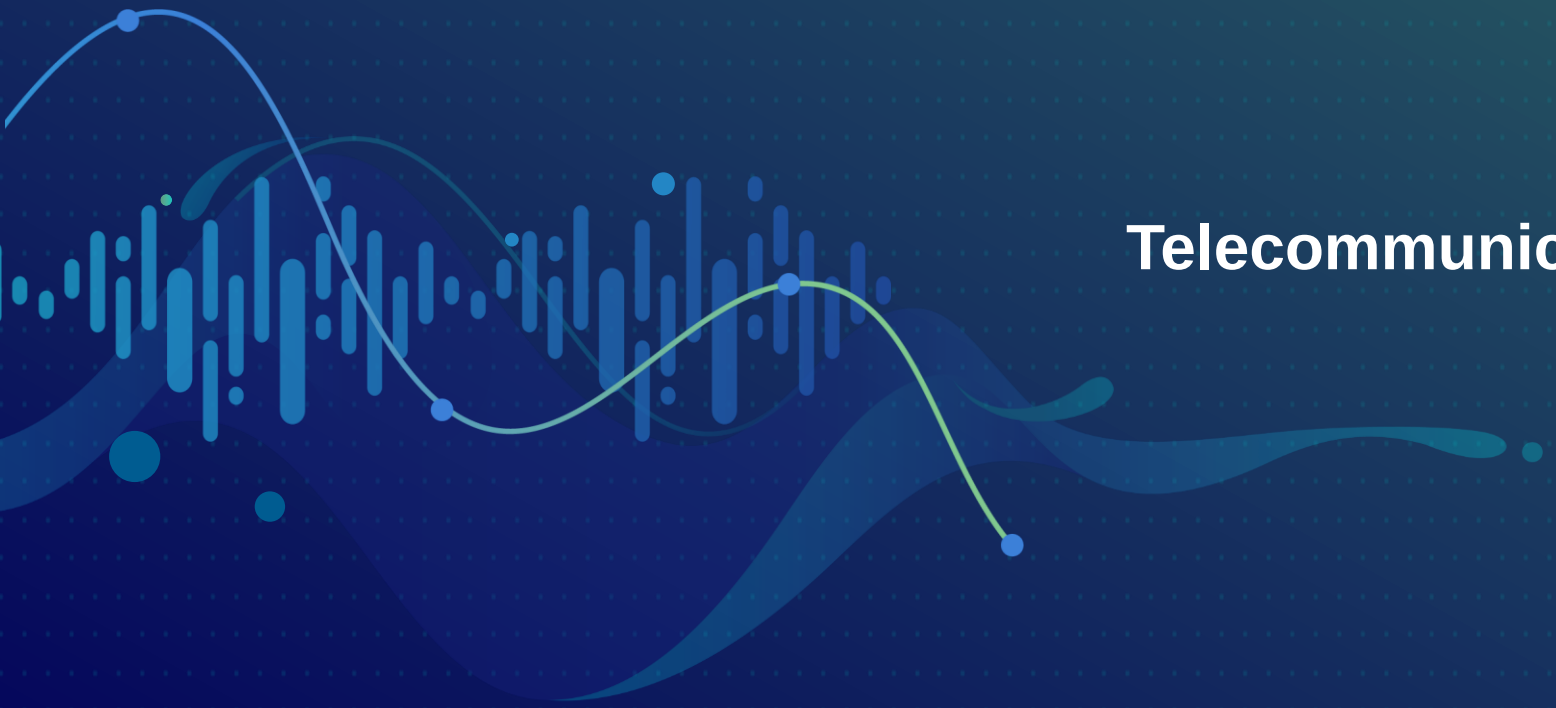
WELCOME

2019 Esri GeoConX Conference



Telecommunications – Digital Transformation

Using multi-modal modeling to up-level the accuracy of fiber network planning

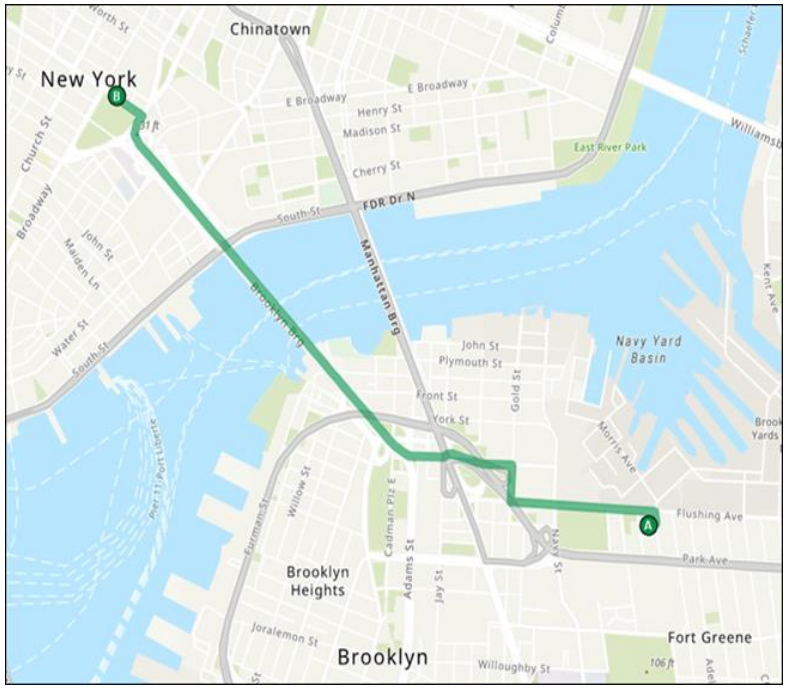
Presented by
Jimmy Hall, VP of Engineering and Product Services

Agenda

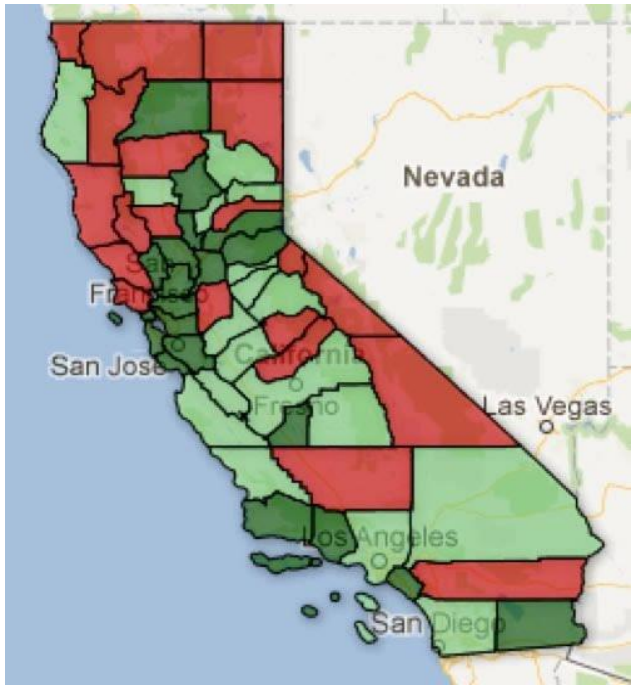
- Modeling Basics: Fiber network planning
- Unimodal modeling
- Multimodal modeling
- Important considerations
- Question/Answer

3-GIS

Basics: Accurate fiber network planning



Best achievable path



ROI/Deployment strategy

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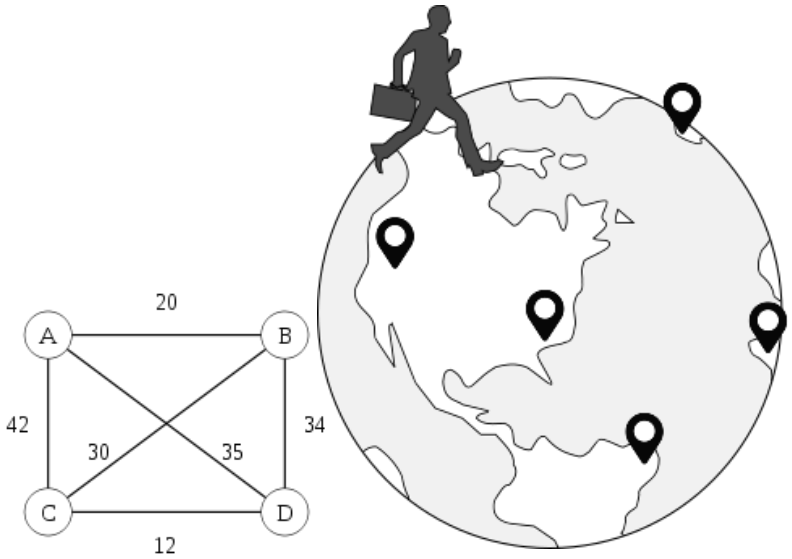
Basics: TSP / NP-Problem

- Traveling Salesman Problem (TSP)

  “Given a list of cities and the distances between each pair of cities, what is the shortest possible route that visits each city and returns to the origin city?”



- NP-Problems

  Humans cannot solve faster than testing every possible answer

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Basics: Routing solutions

- Algorithms

  Dijkstra, A*, Bellman–Ford, Euclidean, Flood fill, Floyd–Warshall, Johnson’s

- Esri ArcGIS Network Analyst extension

  Uses network datasets consisting of edges, junctions, and turns

Basics: Dataset features in fiber networks

- Edges

  Line features representing potential paths for fiber optic cable installation

- Junctions

  Point features representing intersections of potential fiber optic cable paths

- Turns

  Turn features represent the impact of changes in direction for potential fiber optic cable paths

Basics: Routing sources

Typical routing sources

- Street centerline (including offsets)
- Ducts
- Aerial (Telco/Electrical lines)
- Potential trench from parcel offset
- Asphalt/Curb line (micro trenching)
- Sewer lines
- Gas lines
- Water lines
- Steampipes
- Other networks

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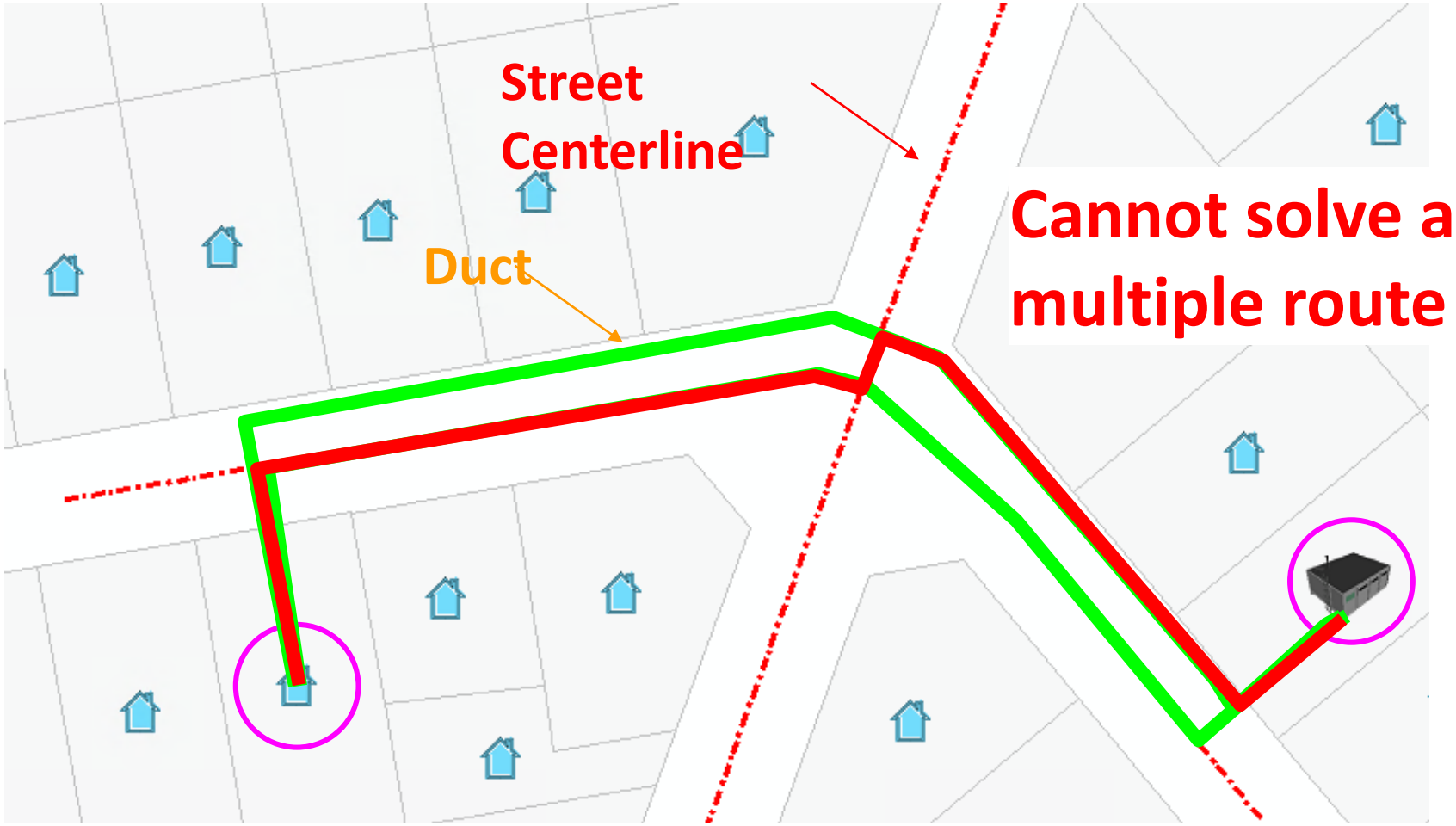
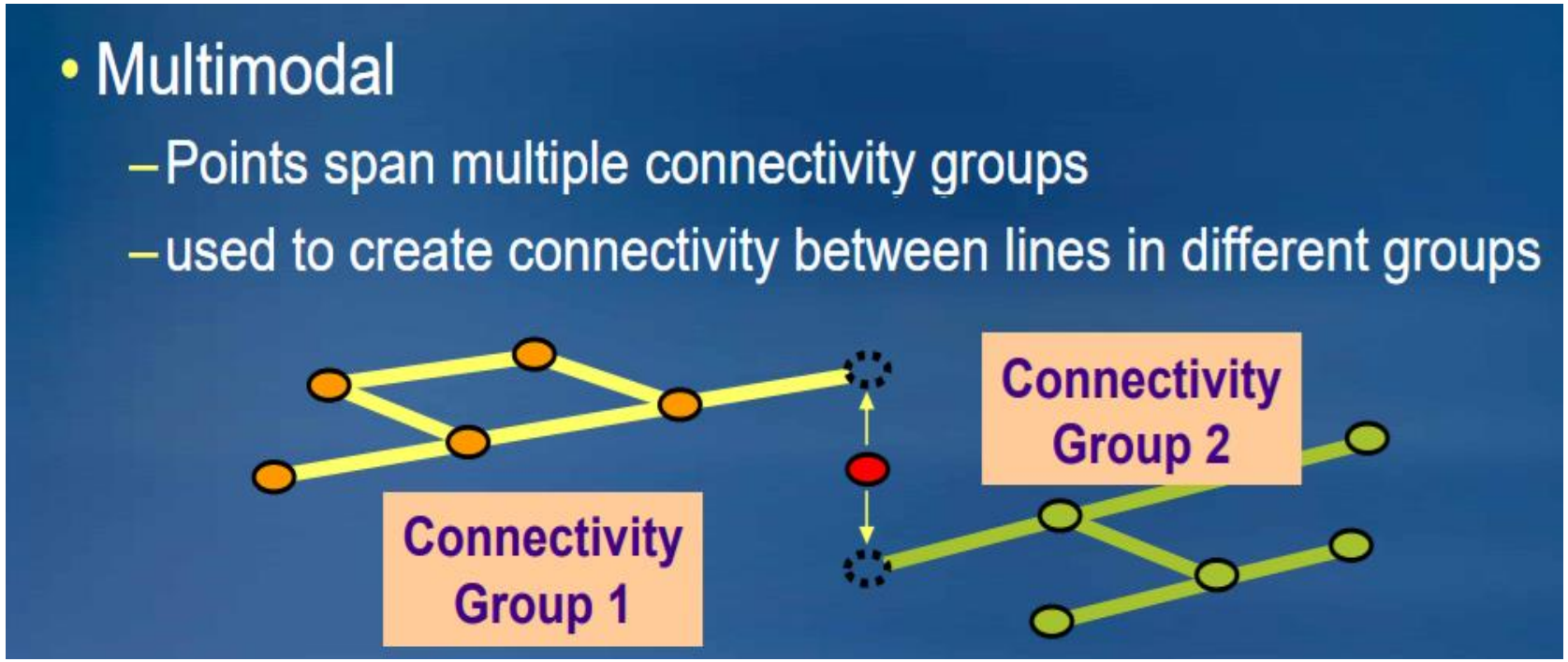
Unimodal modeling: Limitations

- No mixing of routing sources (one or the other)
- Accuracy is usually estimated percentage of known available options
- Planning paths can be drastically different than design

Unimodal modeling: Example



Multimodal modeling: Understanding



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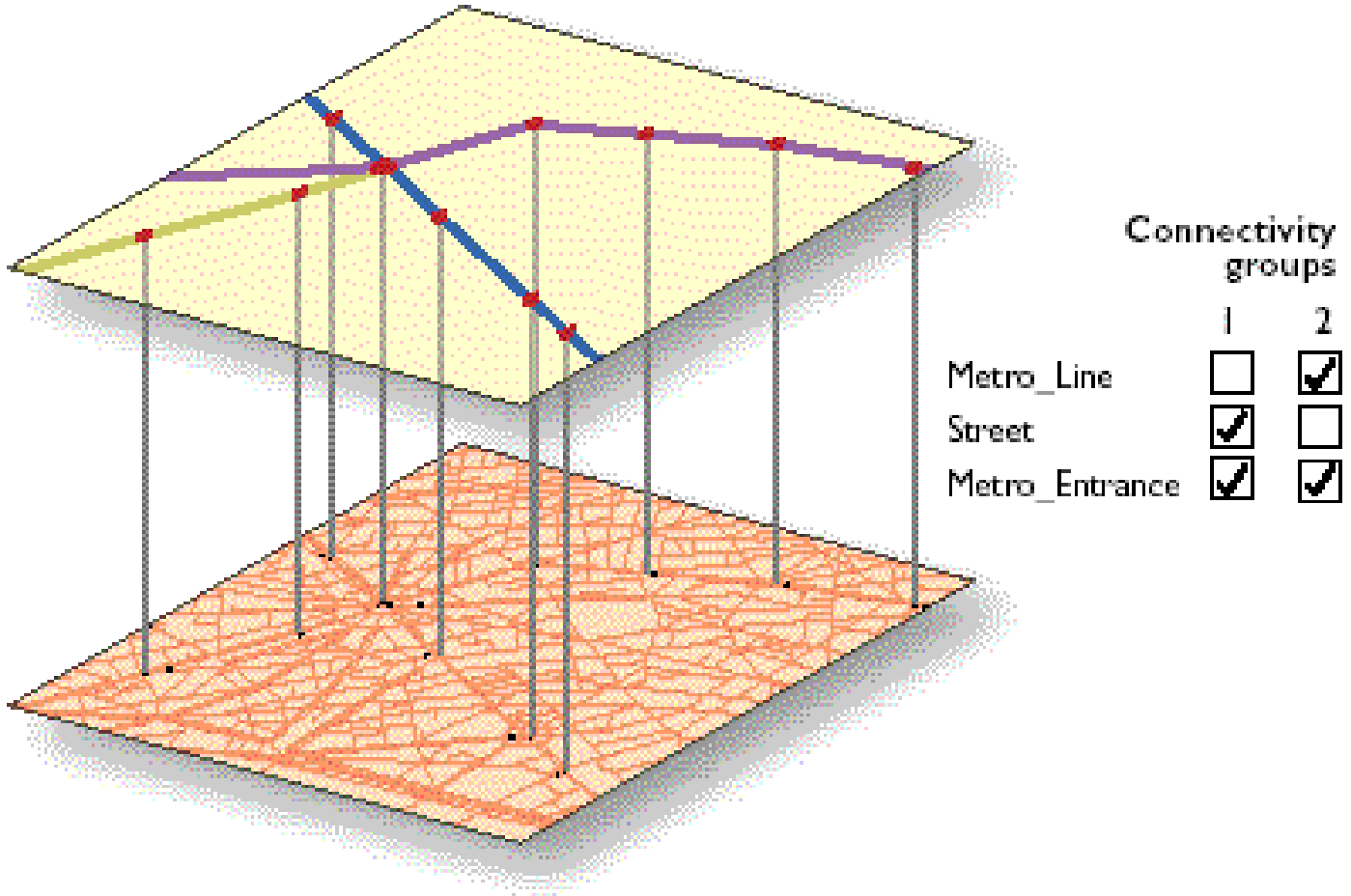
Multimodal modeling: Understanding



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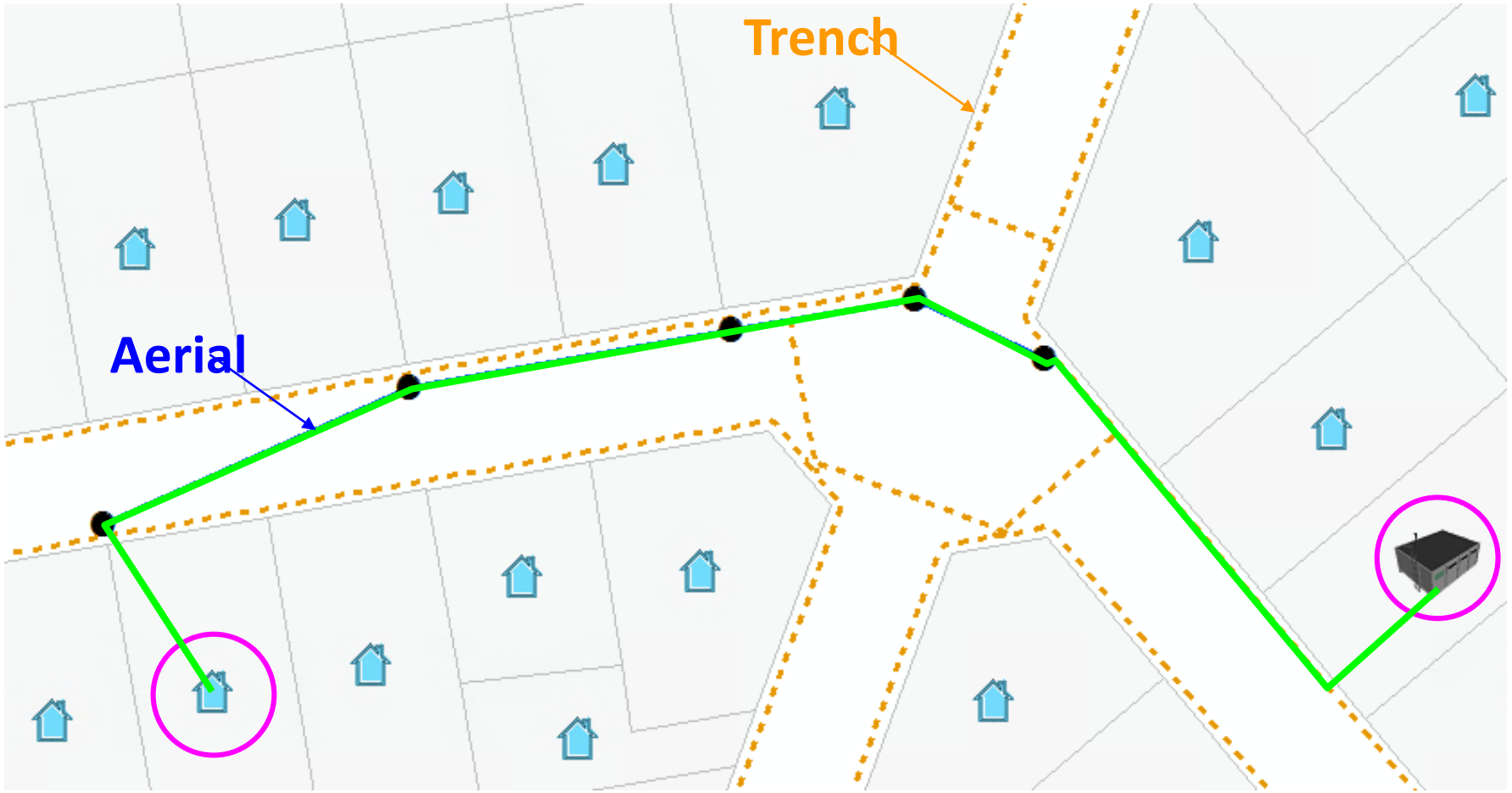
Multimodal modeling: Example



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Multimodal modeling: Benefits

- Pathing
  - Non-genericized pathing source used
  - Controlled/Optimized path switching
- ROI deployment / Budgeting
  - Enhanced Budgeting & Forecasting
  - Targeting correct areas
- Planning to design
  - Minimized changes between plan and design
  - Increased speed to market

Important considerations

- Rational weighting (ex. cost) across data sources
  - Realistic/Proportional weighting
  - Transitional costing
- Data integrity
  - Snapping/Gaps (same feature class)
- Connectivity Group Transitions
  - Create lines to connect feature classes/connectivity groups

Questions/Answers

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