ArcGIS for FTTx Design

Design FTTx network using ArcGIS

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FTTx

• Fiber to the Home (FTTH)
• Fiber to the Building (FTTB)
• Fiber to the Premises (FTTP)
• Fiber to the Curb (FTTC)
FTTx Topology
FTTx Topology

Centralized

Cascaded
FTTx Topology

Cascaded-Feeder Ring

Central Office
1X4
1X8

Central Office
2X8
1X8

1X4
1X8

1X4
1X8

2X8
1X8
1X8
FTTx Design & Inventory Management Challenges

- Data Migration
- Visibility to multiple uses
- Reports
- Inventory Management
- Data Transfer to OSS & BSS systems
- Track As-built Changes
Concepts & Algorithms used

• K-Means Clustering
• Agnes Clustering
• Dijkstra’s Shortest Path
• Betweenness Centrality
• Kruskal Minimum Spanning Tree
• Travelling Salesman Problem(TSP)
• Graph Theory
Input - Demand & Road center Lines
Step-1 : Generate route lines
Option-1
Step-1 : Generate route lines
Option-2
Step-1: Generate route lines
Option-3
Step-1 : ArcGIS Model for Route Lines
Step-2 : Road Crossing Cost Factor
Step-2 : Road Crossing Cost Factor
Step-3 : K Means Clustering of the Demand
Step-3 : Clustering of the Demand
Step-3: Clustering-Agnes
Hierarchy Initial Centroids
Step-3 : Clustering-Agnes
Hierarchy Initial Centroids
Step-4: Distribution & Drop Network
Step-4 : Distribution & Drop Network
Step-5: Feeder Network
Step-5: Feeder Network
Step-5: Feeder Network
Summary

• Agnes Clustering - Initial clusters
• Betweenness Centrality - initial cluster centroids
• K-Means Clustering - for clusters
• Dijkstra’s Shortest Path - shortest path between the nodes
• Betweenness Centrality - for final centroids
• Kruskal Minimum Spanning Tree - drop and feeder routes
• Travelling Salesman Problem(TSP) - feeder route
• Graph Theory
Demo
Q and A