

GEOMETRIC NETWORKS

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A NETWORK MAY BE

**AN ARRANGEMENT OF
INTERSECTING HORIZONTAL
AND VERTICAL LINES**

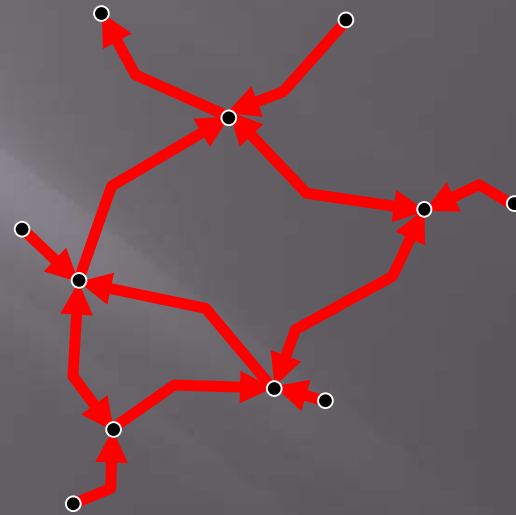
**A GROUP OR SYSTEM OF
INTERCONNECTED PEOPLE OR
THINGS.**

Types of Networks

▣ Dentritic networks

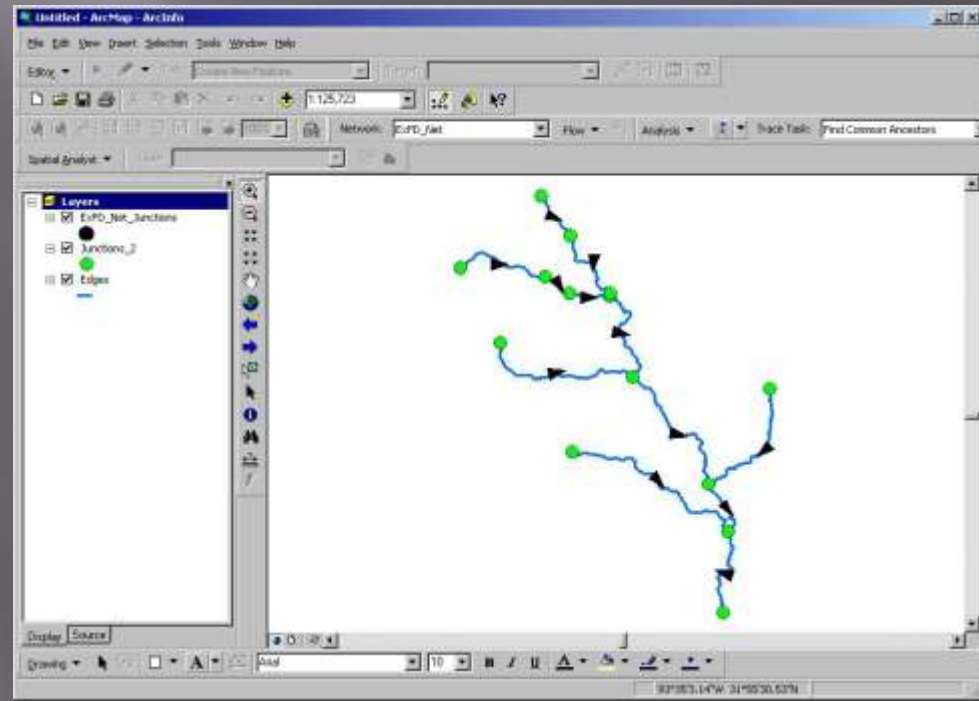


⊕ Loop networks



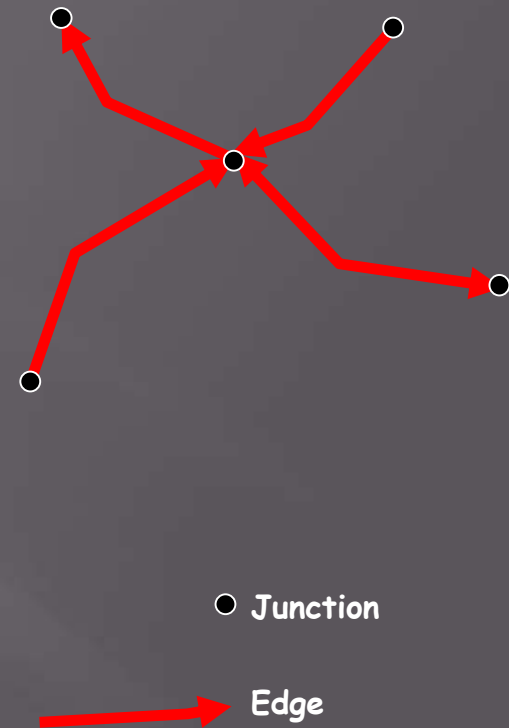
Geometric Networks

- A geometric network is a set of connected edges and junctions, along with connectivity rules.
 - E.g., A water network consisting of water mains, valves, pump stations etc.
- Arc-Catalog or Arc-Tool Box can be used to build geometric networks.



Edges and Junctions

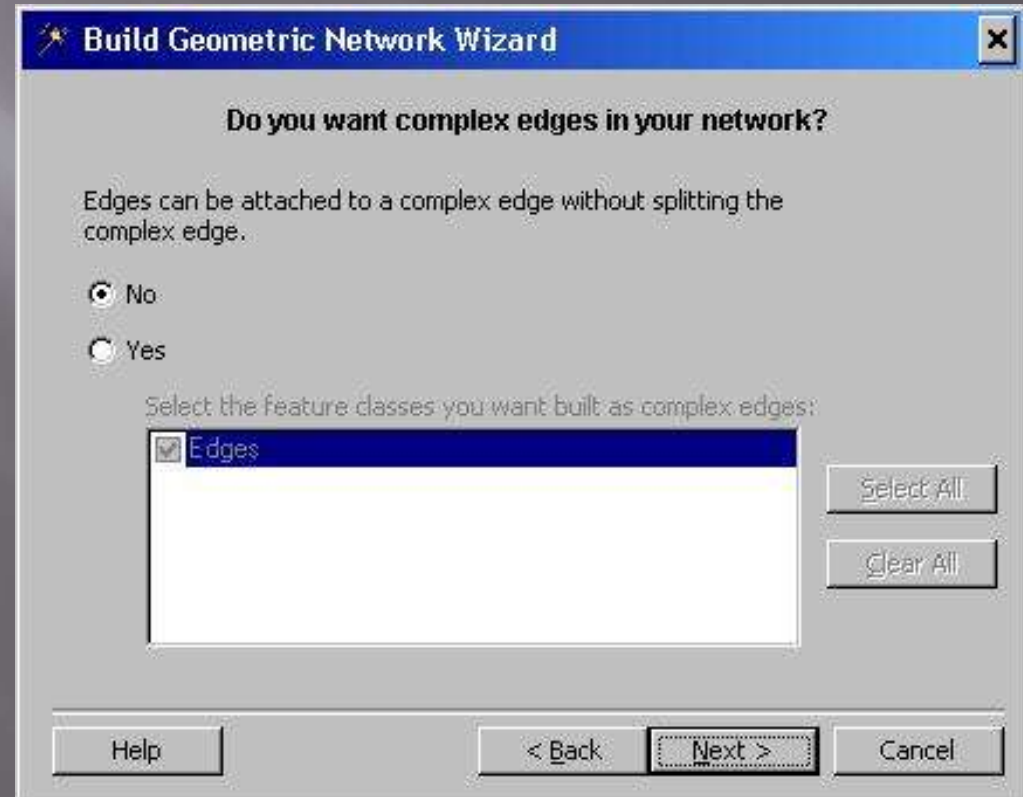
- ▣ A geometric network consists of edge network features and junction network features.
- ▣ **Edges** are network features similar to simple line features. E.g., water mains.
- ▣ **Junctions** are network features similar to simple point features. E.g., valves.
- ▣ Edge - Edge connectivity is built through junctions



While creating a geometric network in your arc-catalog you will encounter following terminologies

Simple and Complex features

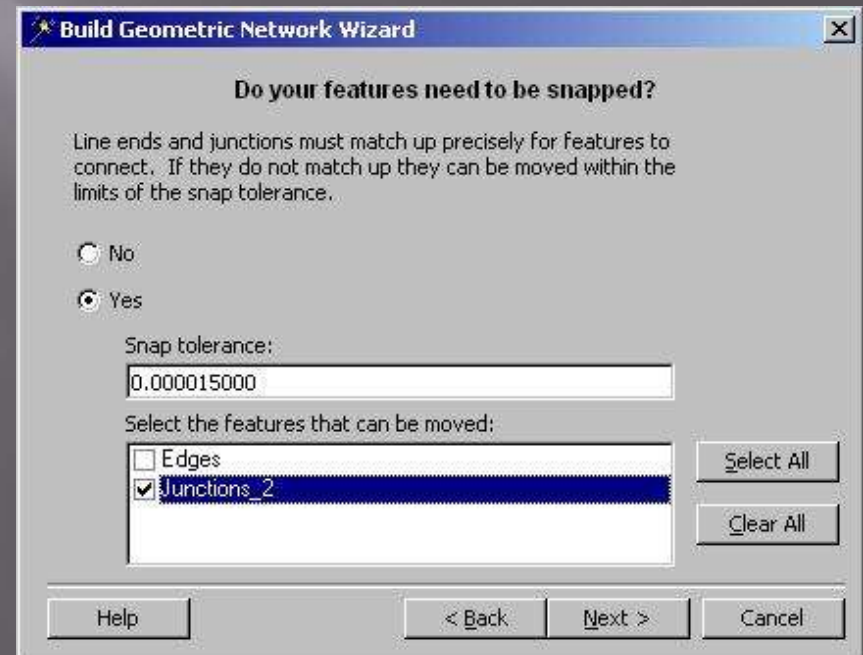
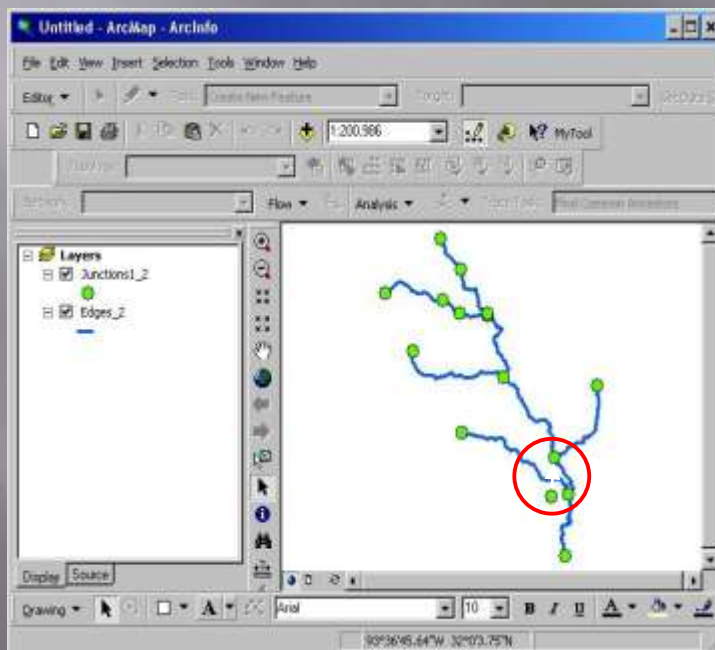
- ▣ **Simple Edges** are always connected to exactly two junctions, one at each end.
- ▣ **Complex Edges** are always connected to at least two junctions at their endpoints but can be connected to additional junctions along their length.



snapping

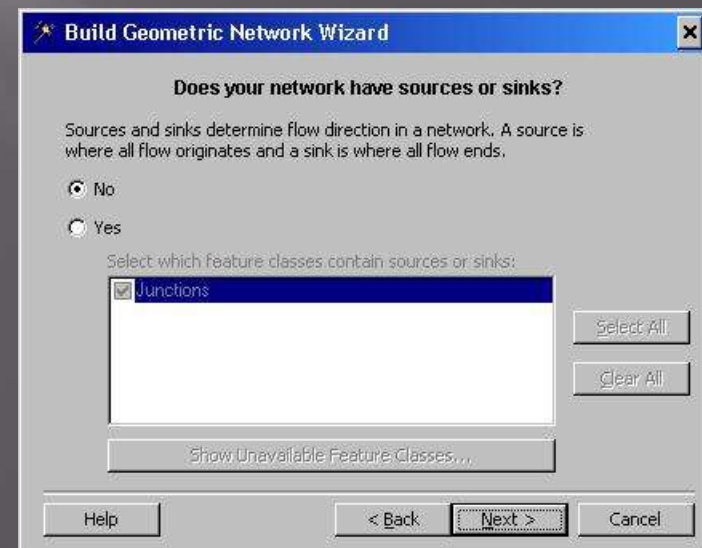
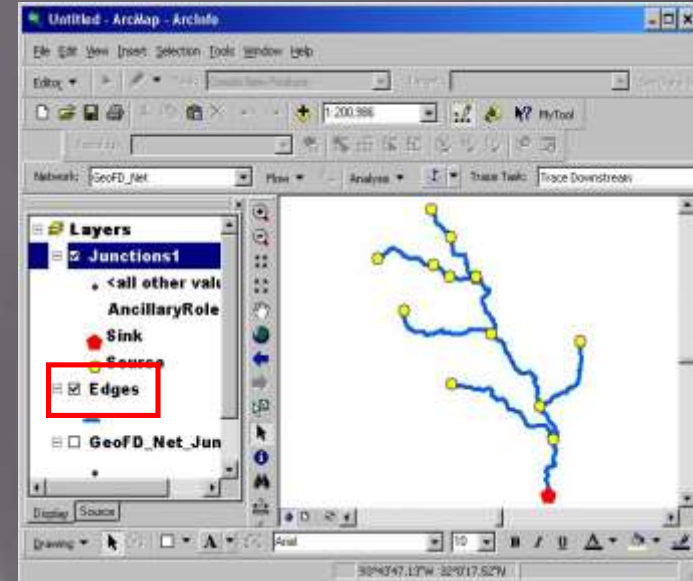
- Snapping is a process moving features. For example making line ends and junctions coincide.
- **Snap tolerance** defines the maximum distance a network feature could be moved.

Snapping



Sources and Sinks

- ▣ Sources and Sinks are used to define the flow direction in the network.
- ▣ Sources are junctions that push the flow away from themselves.
- ▣ Sinks are junctions that pull flow towards themselves.
- ▣ An attribute called '*Ancillary Role*' defines whether a junction is source or sink.



Flow Direction

- ▣ The flow direction is based on the source and sink

The screenshot displays the ArcMap interface with a network diagram and an attributes table. The network diagram shows a series of blue lines (edges) connecting yellow circles (sources) and red circles (sinks). The attributes table, titled "Attributes of Junctions1", lists 14 records with columns for CTID, Enabled, and AncillaryRole. The AncillaryRole column is highlighted with a red border, showing values of Sink for CTID 1 and Source for CTIDs 2 through 14.

CTID	Enabled	AncillaryRole
1	True	Sink
2	True	Source
3	True	Source
4	True	Source
5	True	Source
6	True	Source
7	True	Source
8	True	Source
9	True	Source
10	True	Source
11	True	Source
12	True	Source
13	True	Source
14	True	Source

Flow types

- Determinate flow occurs in an edge if a unique flow direction can be assigned.
 - E.g. A dendritic stream network.
- Indeterminate flow direction occurs in an edge if the flow direction is not unique.
 - E.g. A transportation network.
- Uninitialized flow direction occurs when the flow in an edge is not influenced by sources and sinks.
 - E.g. A stream network with sources and sinks not defined

Network weights

- A weight can be defined as the cost for traversing an element in the network.
 - E.g., pressure loss (per unit length) due to friction in the pipe.
- Many to zero or many to one relationships exist between attributes and network weights



Enabled and Disabled features

- ▣ Features in a network can be enabled or disabled.
- ▣ Disabled features act as barriers to flow, whereas enabled features allow the flow to path through.
 - E.g., due to maintenance of a pipe in the network, it may be disabled temporarily.



FID	Shape*	OBJECTID	Enabled
0	Point	4240	1
1	Point	4258	1
2	Point	4268	1
3	Point	4285	1
4	Point	4305	1
5	Point	4318	1
6	Point	4343	1
7	Point	4344	1
8	Point	4347	1
9	Point	4351	1
10	Point	4361	1
11	Point	4374	1
12	Point	4173	1
13	Point	4174	0

Record: 14 | 5 | Show: All Selected

Now the demo