

High Definition Road Maps

Course 4, Module 2, Lesson 4

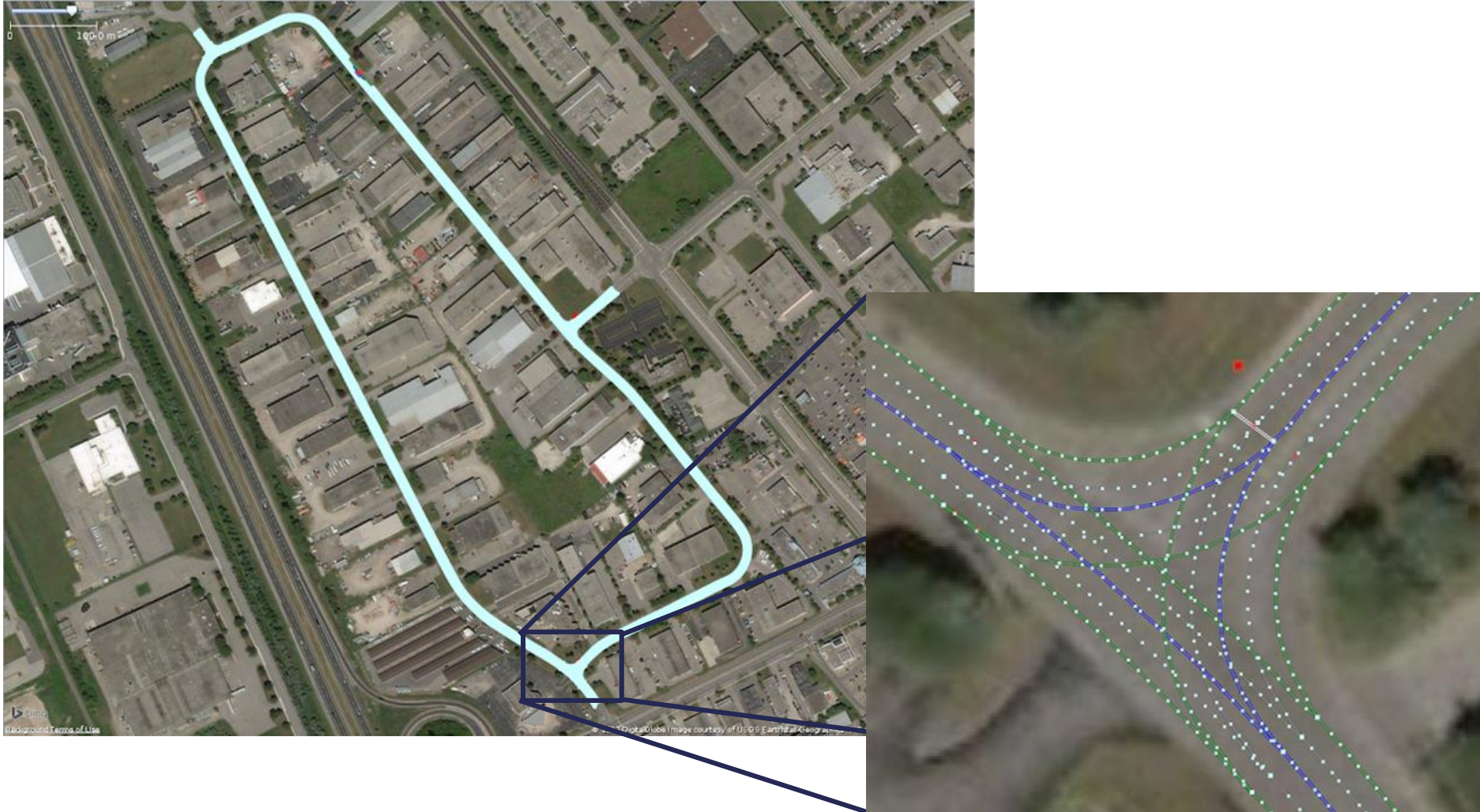


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Learning Objectives

- Defining lanelet map
- Defining the elements that make up a lanelet map
 - Lanelet element
 - Intersection element
 - Operations that can be done on lanelets
- Creation of lanelet maps
- Connectivity between lanelets

High Detailed Road Map



Lanelets: Efficient Map Representation for Autonomous Driving

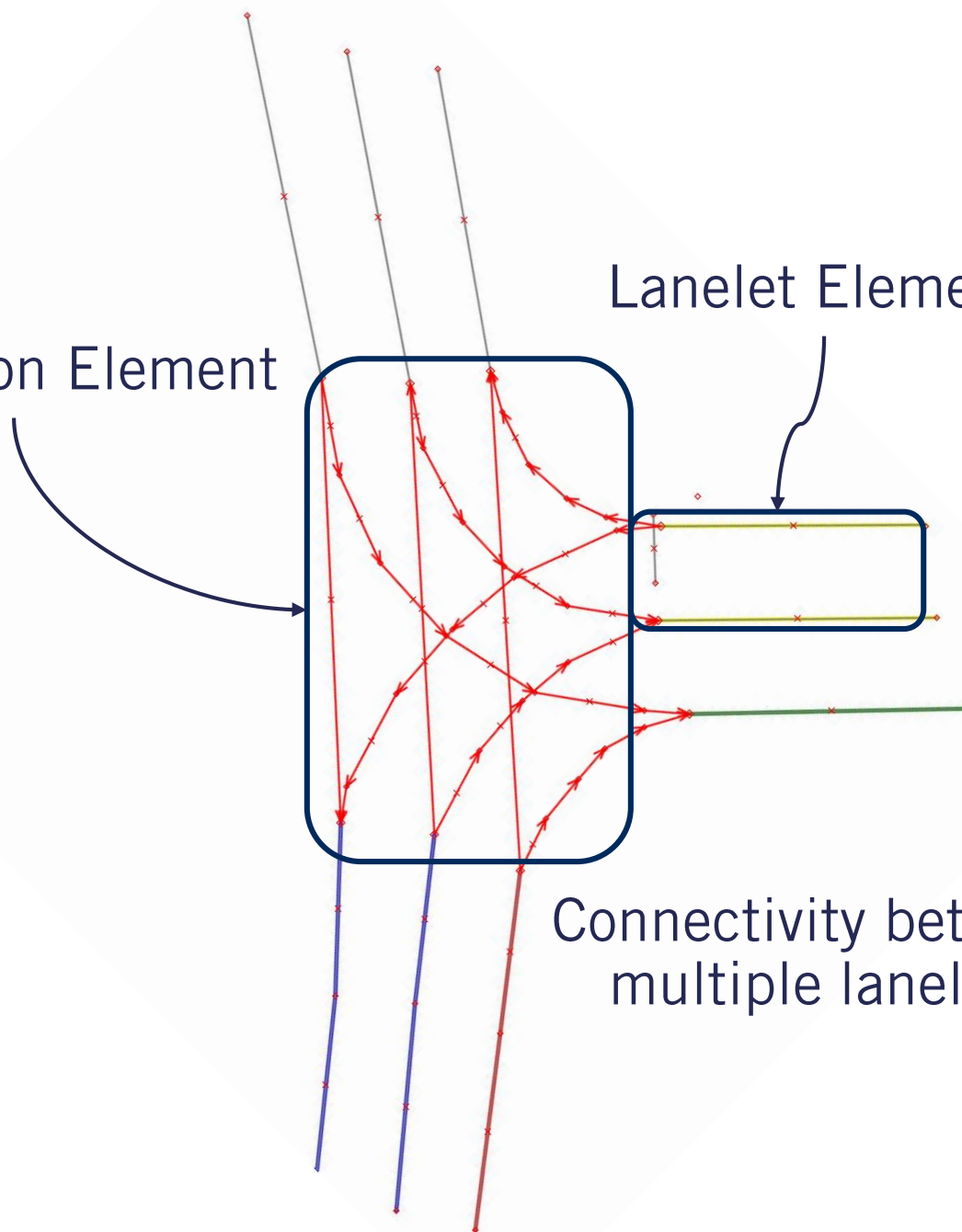
Lanelet Map



Intersection Element

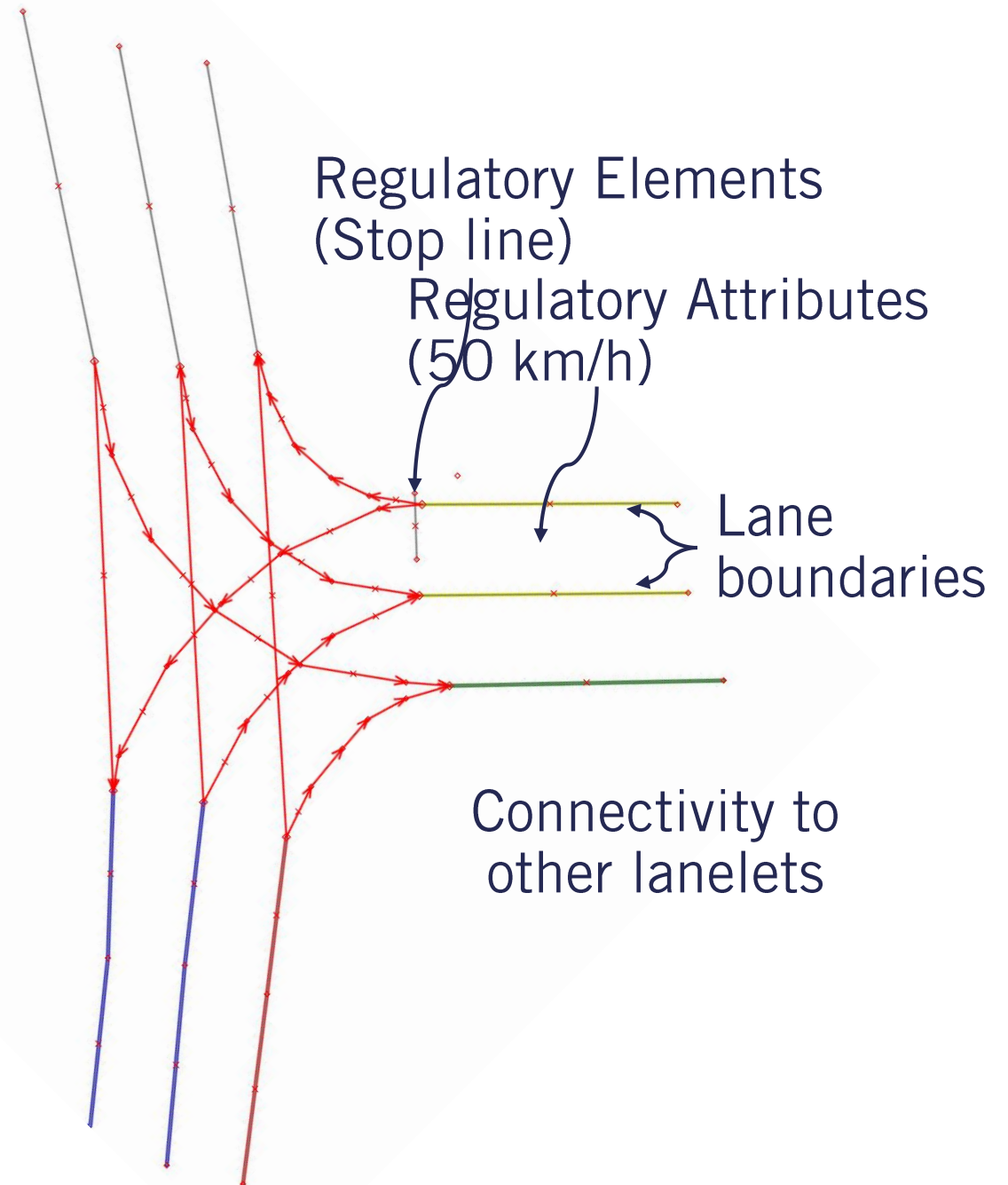
Lanelet Element

Connectivity between
multiple lanelets



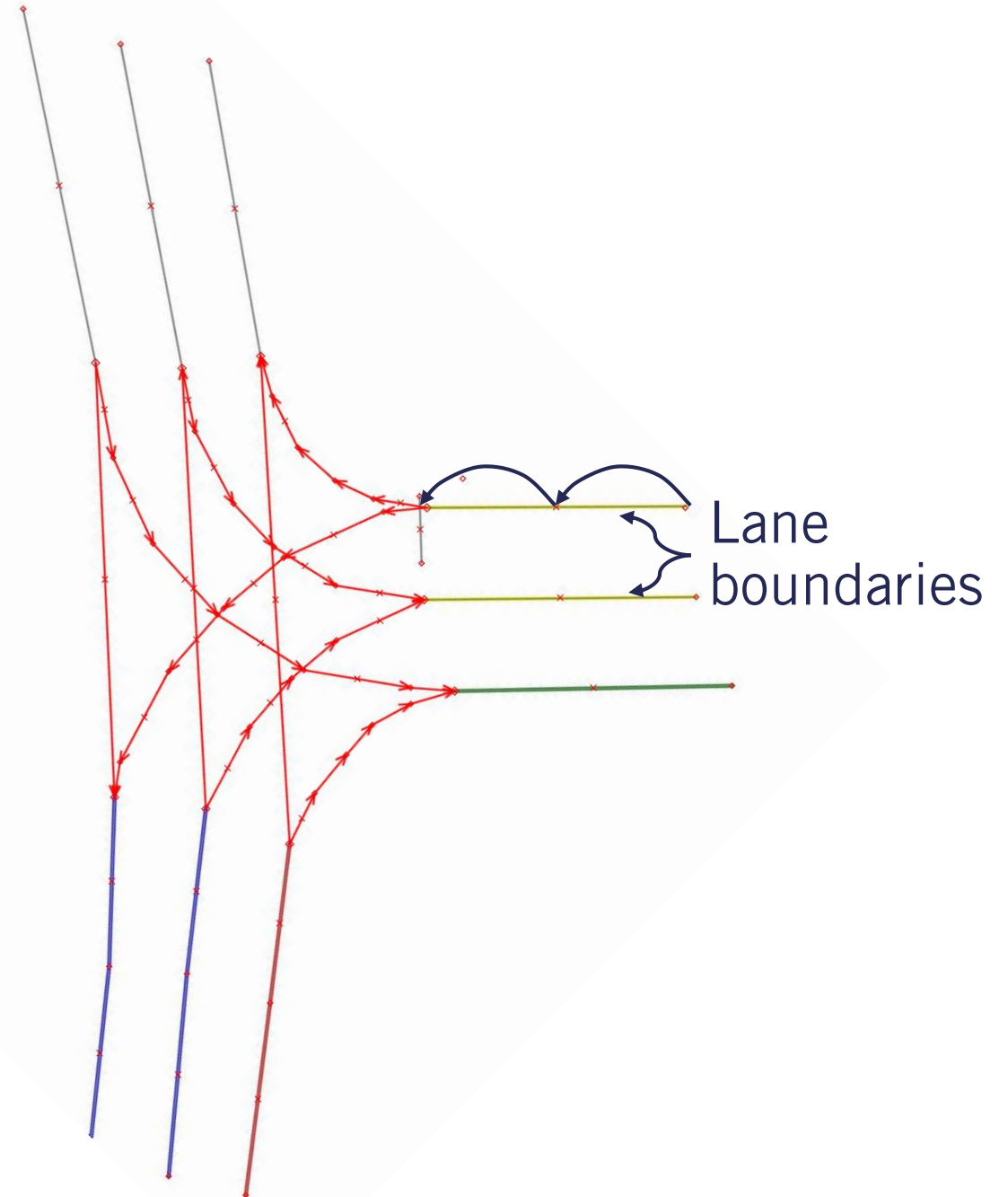
Lanelet Element

- Defines the following:
 - Left and Right Boundaries
 - Regulation
 - Elements
 - Attributes
 - Connectivity to other lanelets
- A new lanelet is created when a new regulatory element is encountered or ends



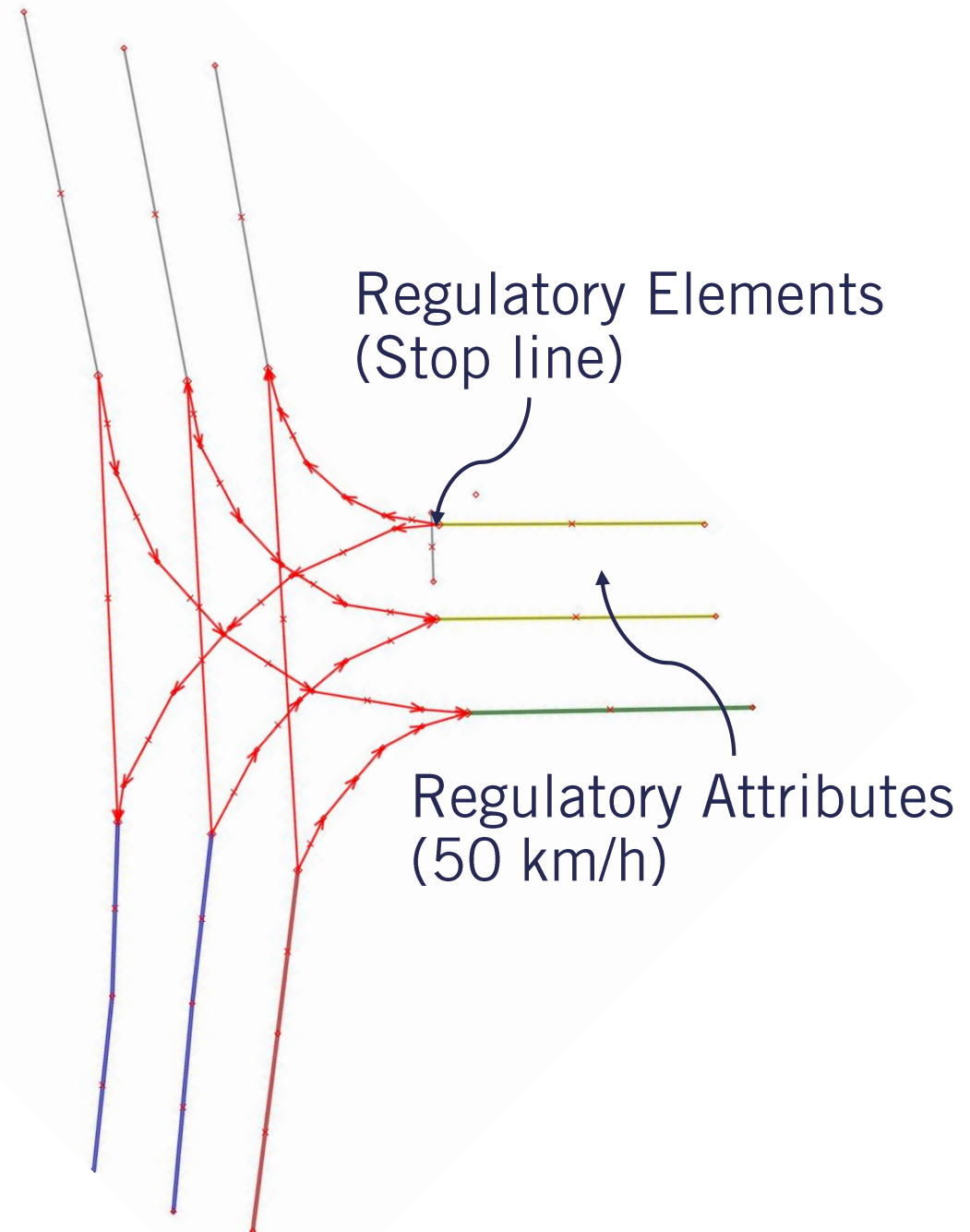
Lanelet Boundaries

- Defines the edges of a driving lane
- A list of pointers points creating a polygonal line
 - X, Y, and Z coordinates
- Different operation can be performed on boundaries:
 - Heading
 - Curvature
 - Center line

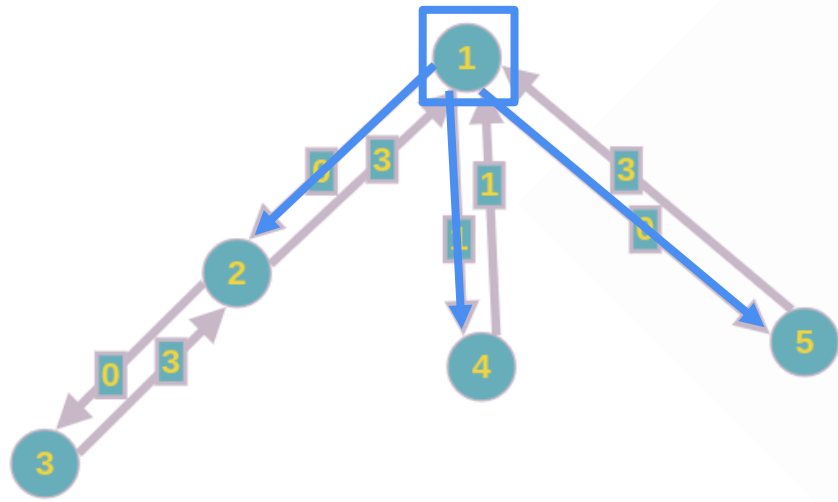


Lanelet Regulations

- Elements - a list of points creating a line identifying stop location
 - Stop line
 - Traffic lights line
 - Pedestrian crossings
- Attributes - a set of regulation attributes assigned to a lanelet
 - Speed limit
 - Crossing another lanelet



Lanelet Connectivity



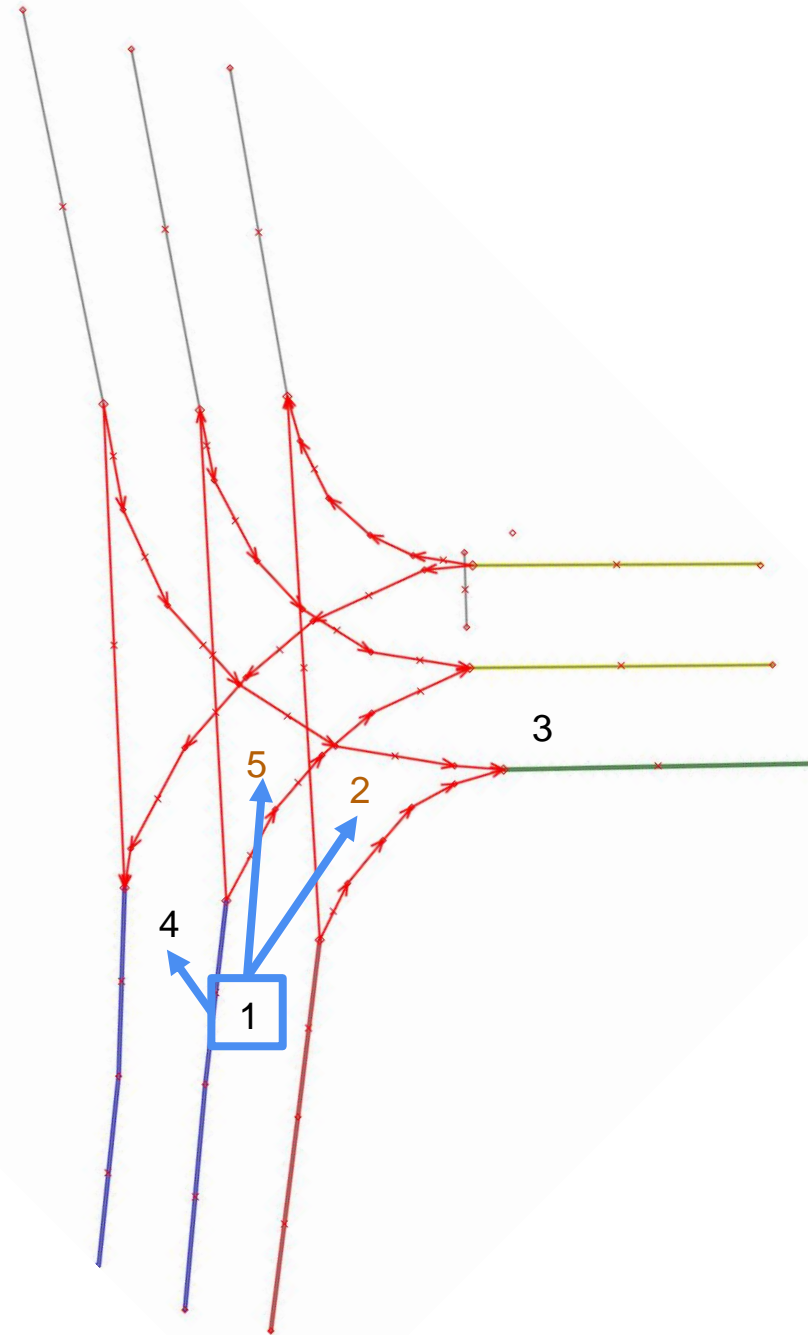
Edges:

0 = next

1 = left

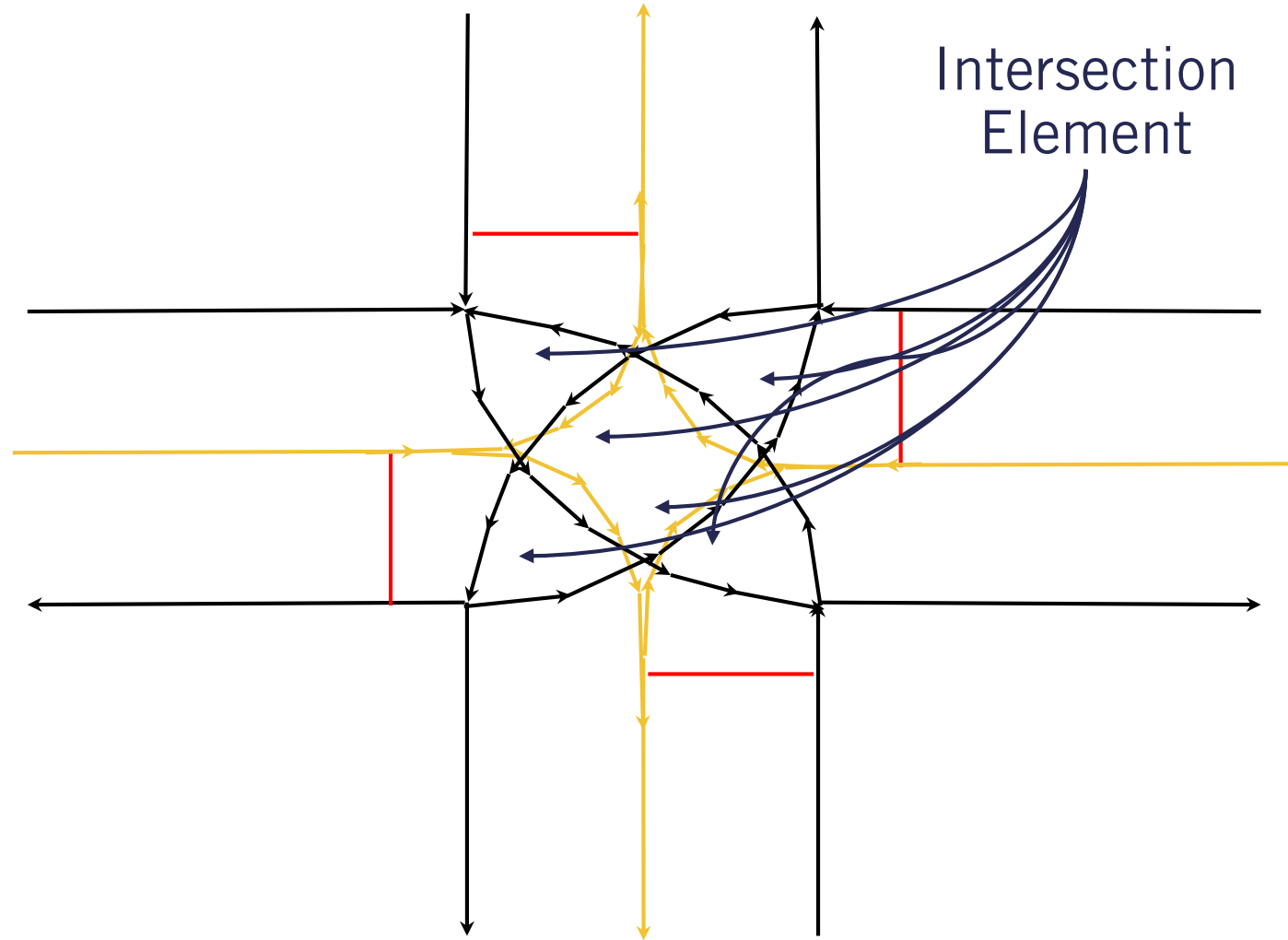
2 = right

3 = previous



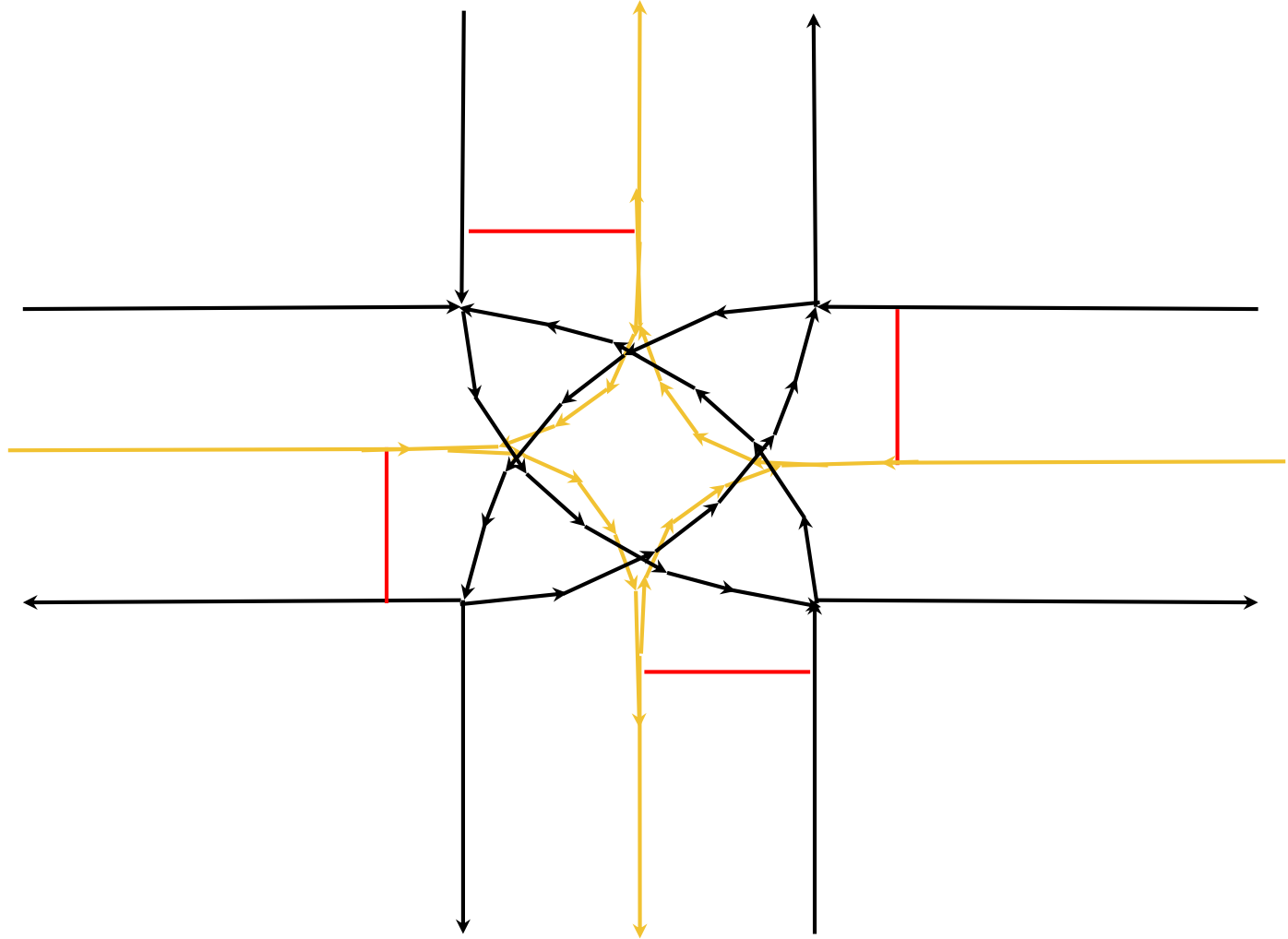
Intersections

- Intersection Element - pointer to all lanelets which are part of an intersection
- Helps with behaviour assignments



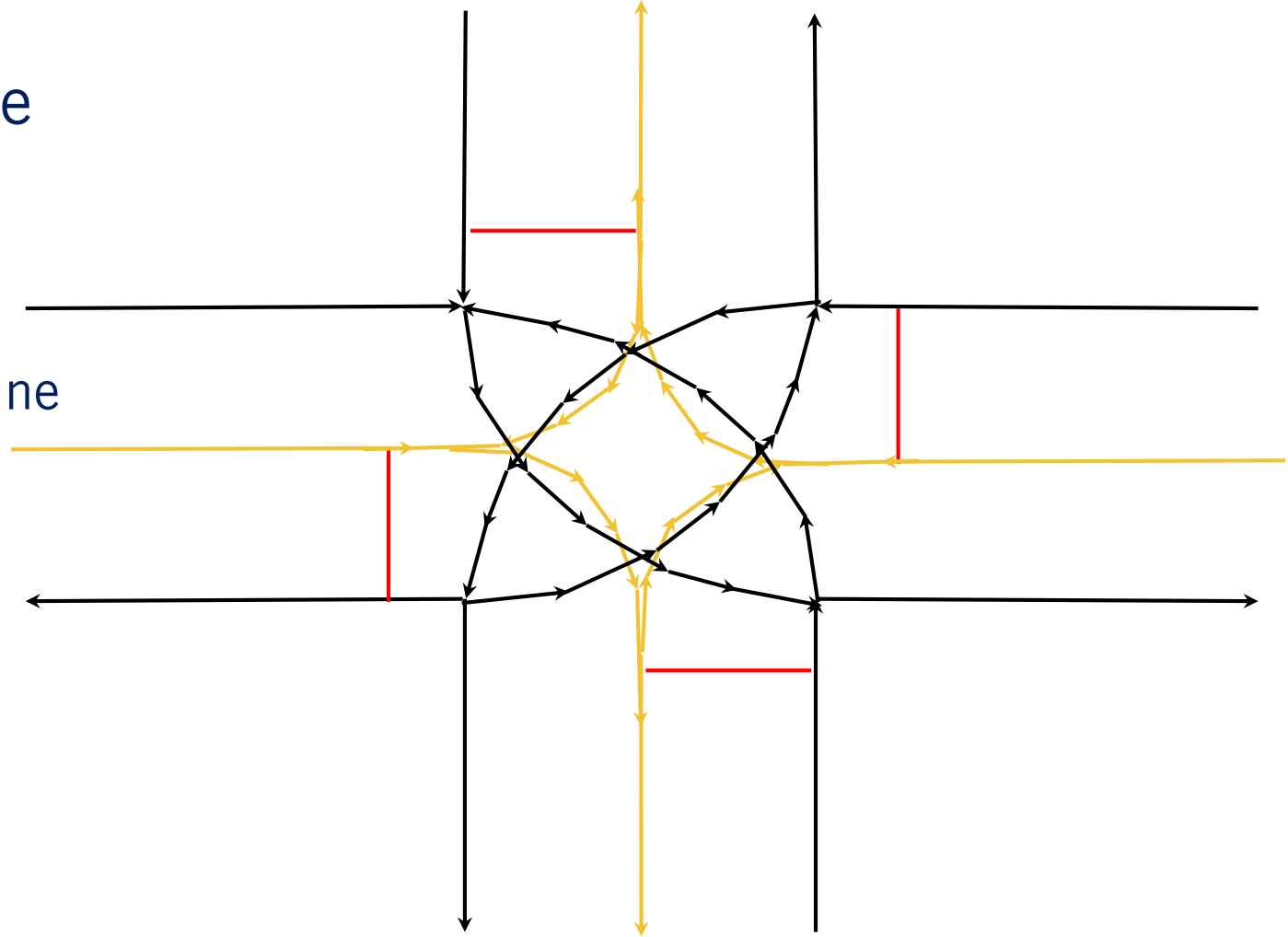
Operations Done On Lanelets

- Path planning through complex road networks
- Localize Dynamic Objects
- Interactions with other Dynamic Objects



Creations Of Lanelets

- 3 methods to create the lanelet map
 - Offline creation
 - Online creation
 - Offline creation with online updating



Summary

- Defining lanelet map
- Defining the elements that make up a lanelet map
 - Lanelet element
 - Intersection element
 - Operations that can be done on lanelets
- Creation of lanelet maps
- Connectivity between lanelets
- Next: Mission Planning

Additional slides



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Lanelet In Code

