

Towards Shared Interpretation

Common ground for OpenDRIVE users and producers

About Me

- Former lead of HD Map tools team at HERE Maps
- OpenDRIVE Core Team representative at HERE
- 10+ years designing and collaborating on virtual road models
- Cofounded VectorZero in 2017

alex.goldberg@vectorzeroinc.com
www.vectorzeroinc.com



RoadRunner Editor (video)

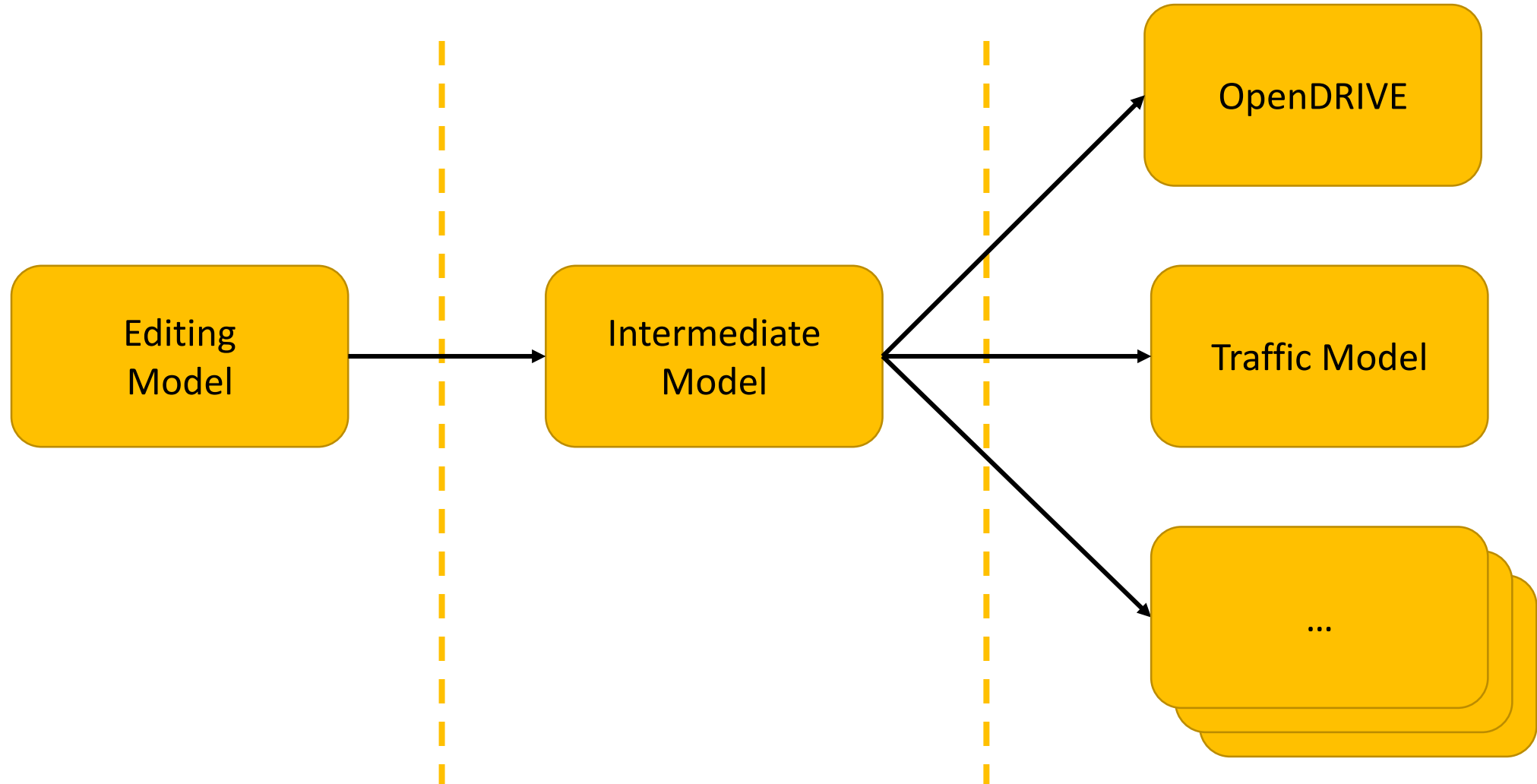


<https://youtu.be/5Si77LULrNo>

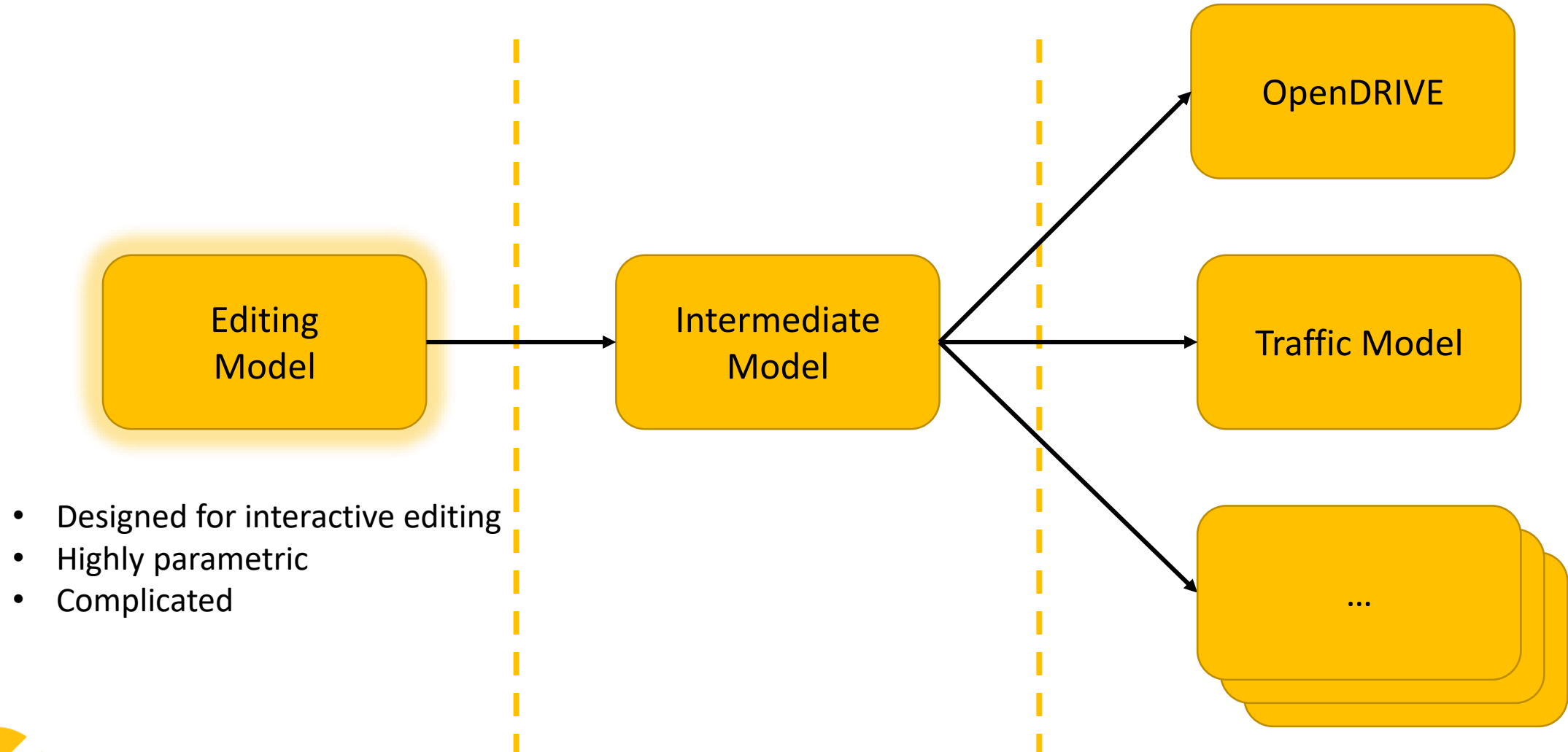
Alex Goldberg, VectorZero Inc. - ASAM OpenDRIVE Kickoff



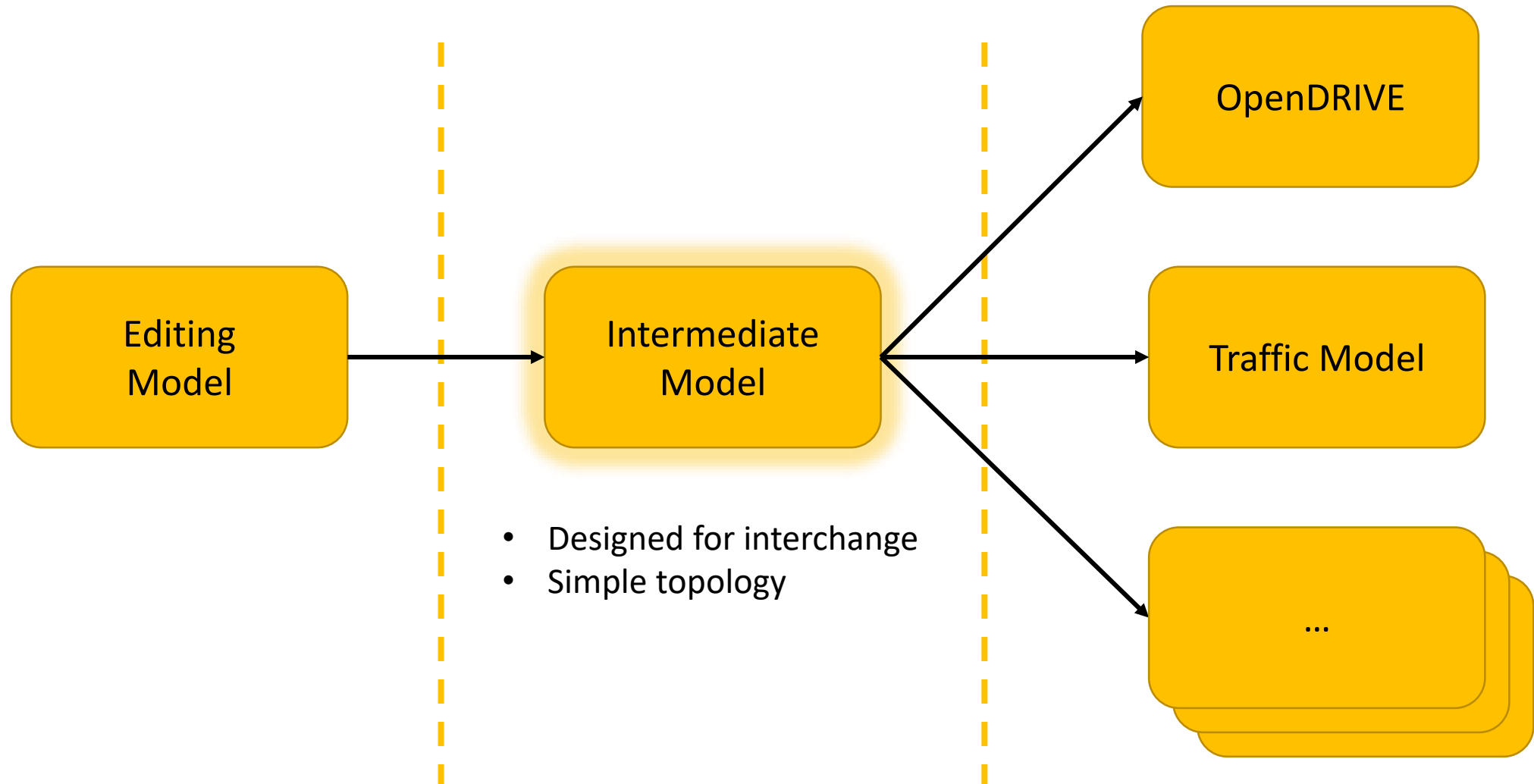
Road Models in RoadRunner



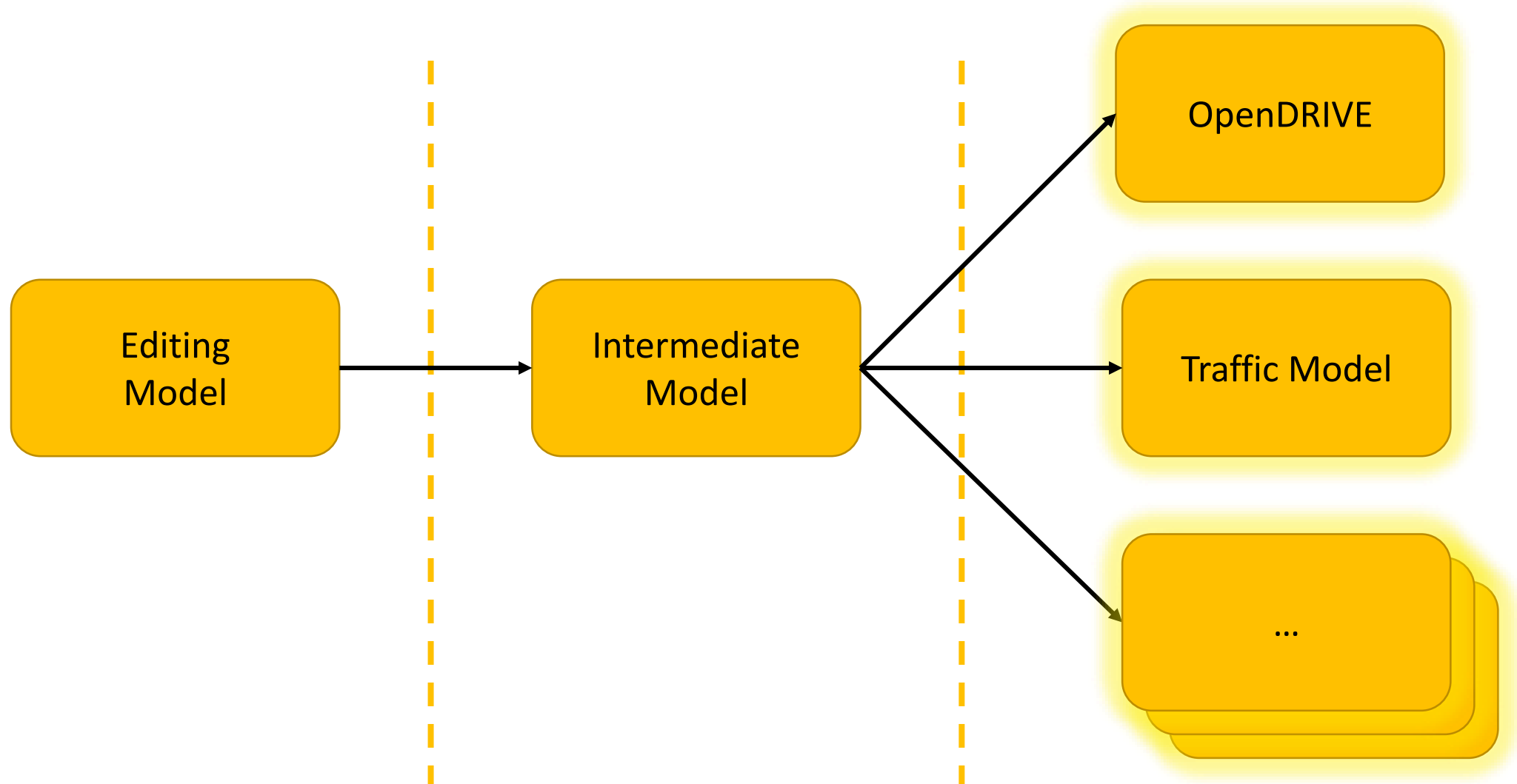
Road Models in RoadRunner



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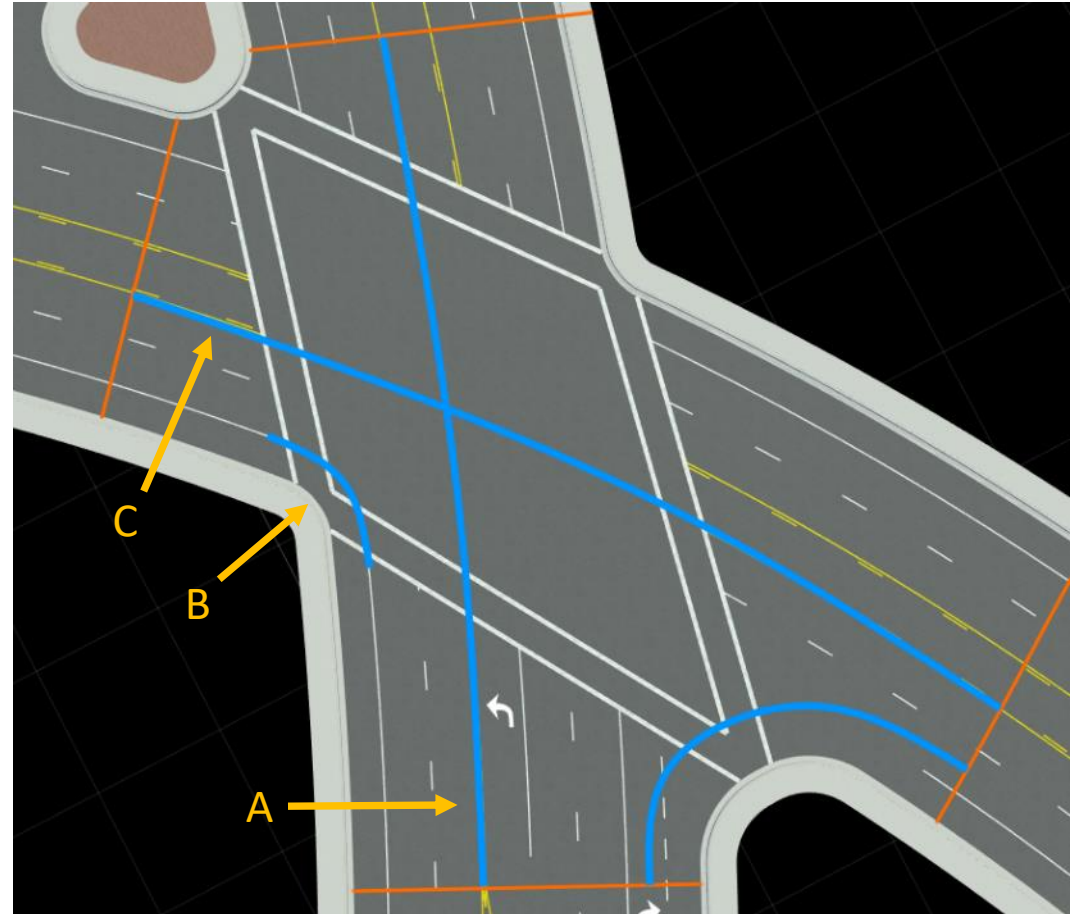


OpenDRIVE Junctions

Pain points and suggestions

Overlapping Paths

- All junction paths must start/end at the same perpendicular
- The right turn represented by B must 'reach' the orange lines
- Have to invent geometry, or concatenate B with pieces of A and C.



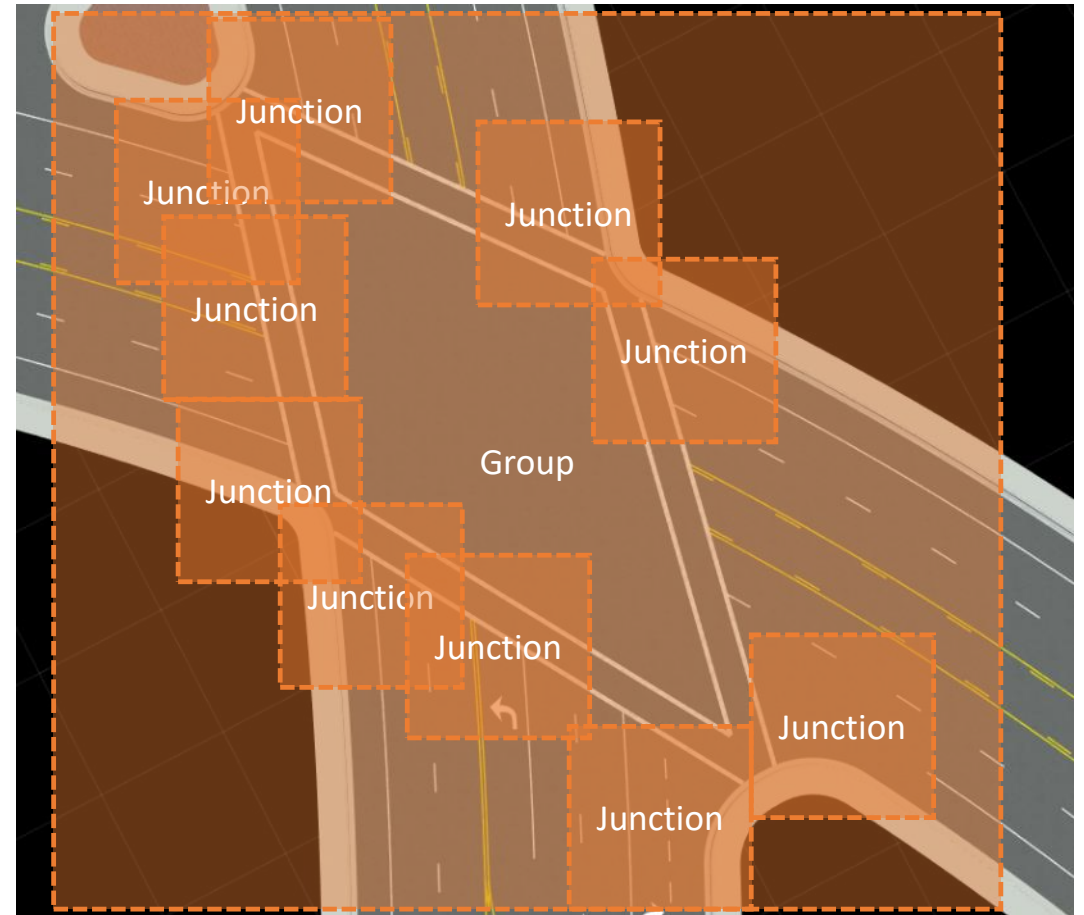
Overlapping Paths

- Concatenation yields overlapping geometry (in red)
- Duplicate geometry/attributes
- Concatenation is tricky
- Import is tricky



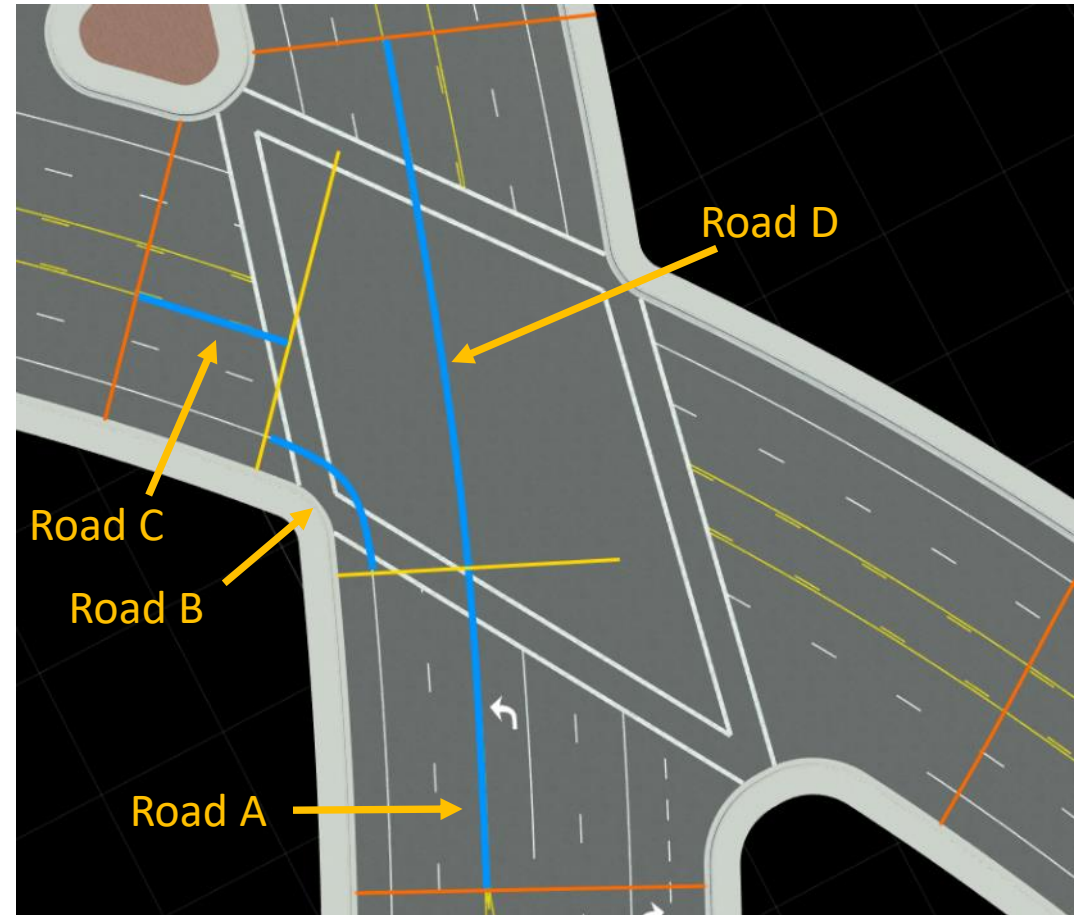
Overlapping Paths

- Option: Lots of grouped junctions
- Junction anywhere two paths diverge or meet
- Probably not an appealing option...



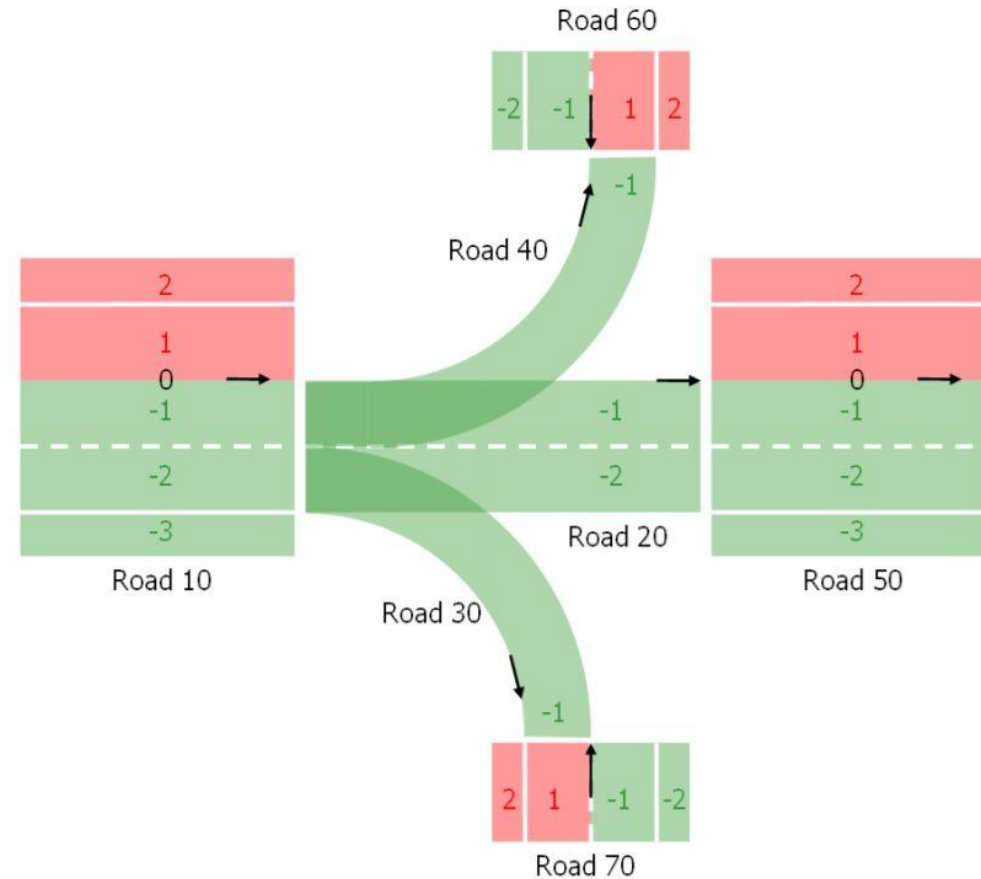
Overlapping Paths

- Alternative: Allow roads to start/end inside the intersection
- Need to modify topology model to connect them...



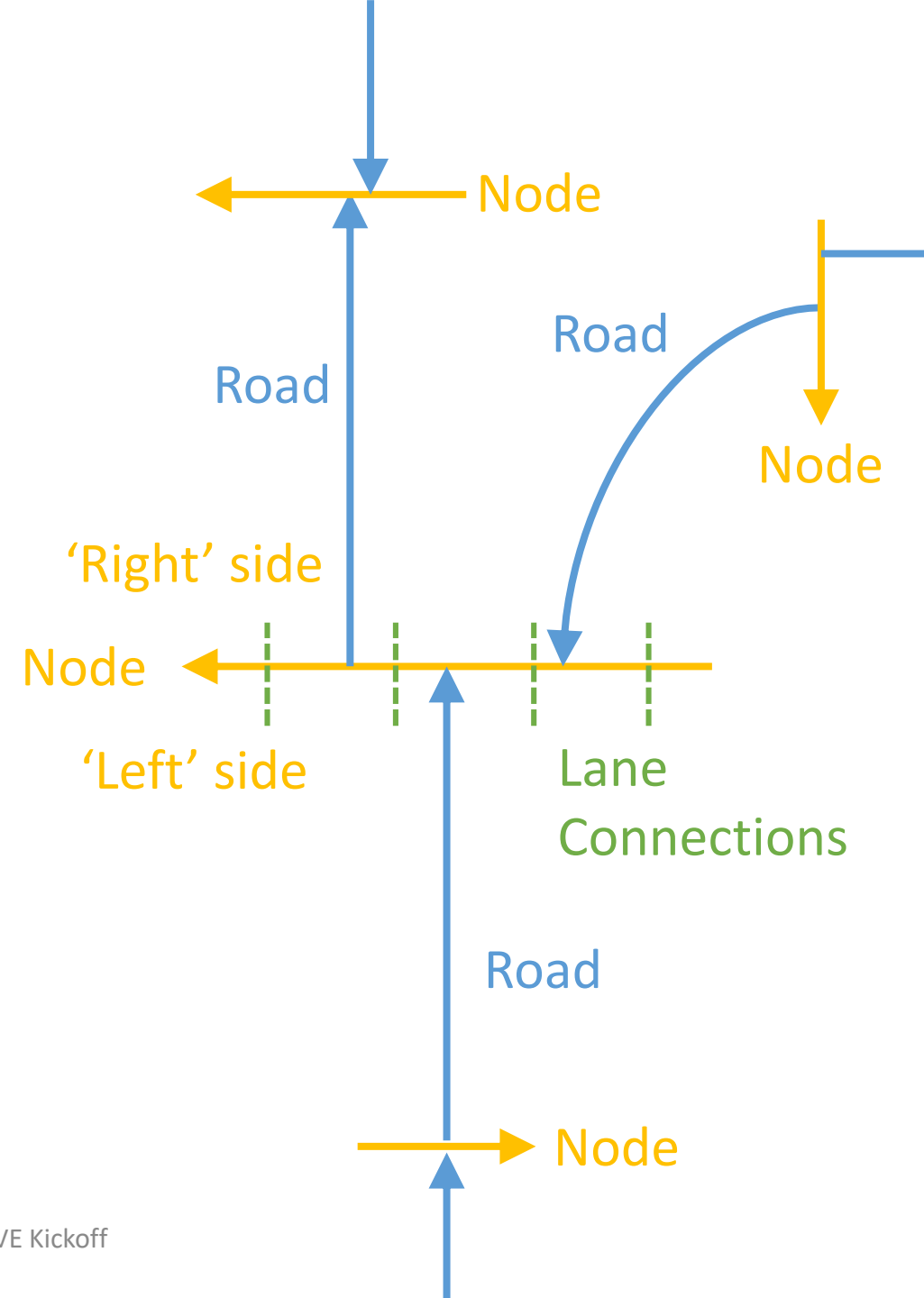
Current Topology Model

- Current model has two ways to connect roads (<link> vs. <connection>)
- Can mix the two in some cases (only need <connection> in 'ambiguous' cases?)
- Terminology is unintuitive
- Customers have found this confusing



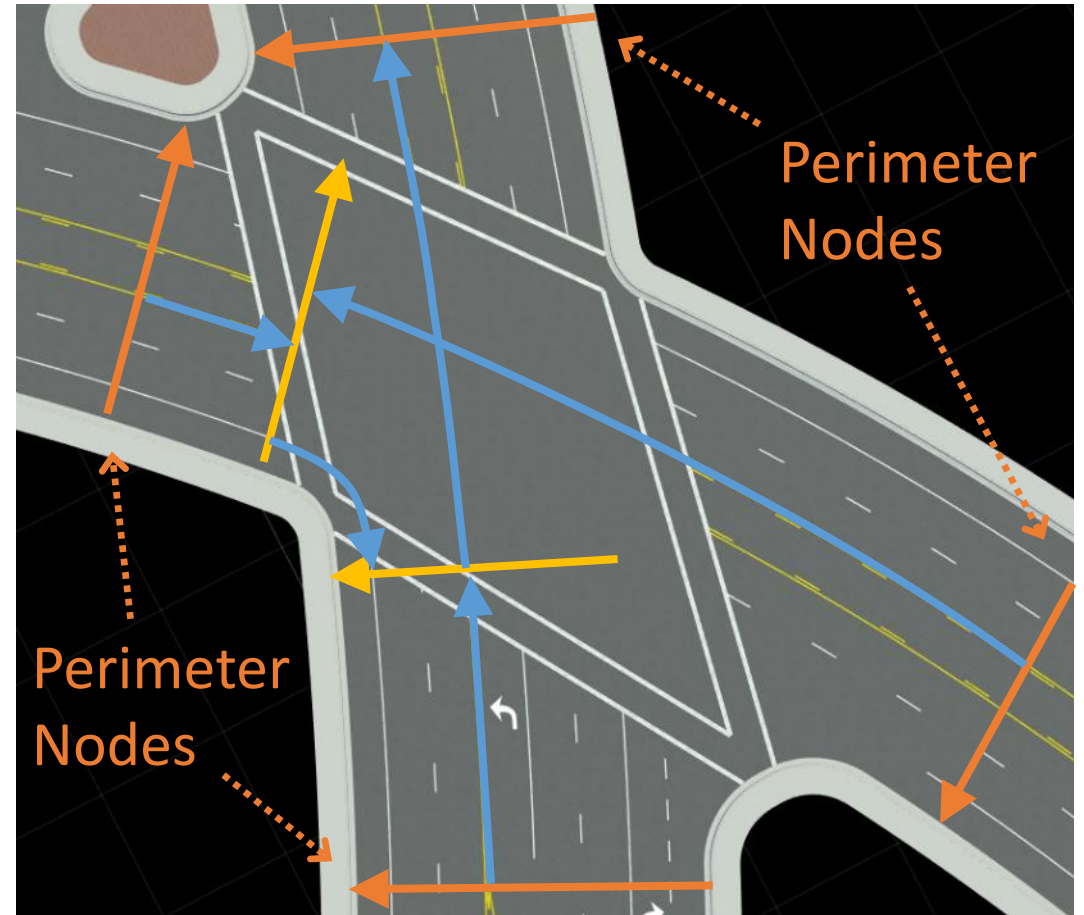
Unified Topology Model

- All roads are connected by new 'node' objects
 - Nodes have no geometry, but have two conceptual 'sides'
 - Nodes store lane connectivity
 - Use simplified nodes between lane sections
- Note: If new objects are not desirable, could store data redundantly at the ends of roads (i.e. expand <link> definition)



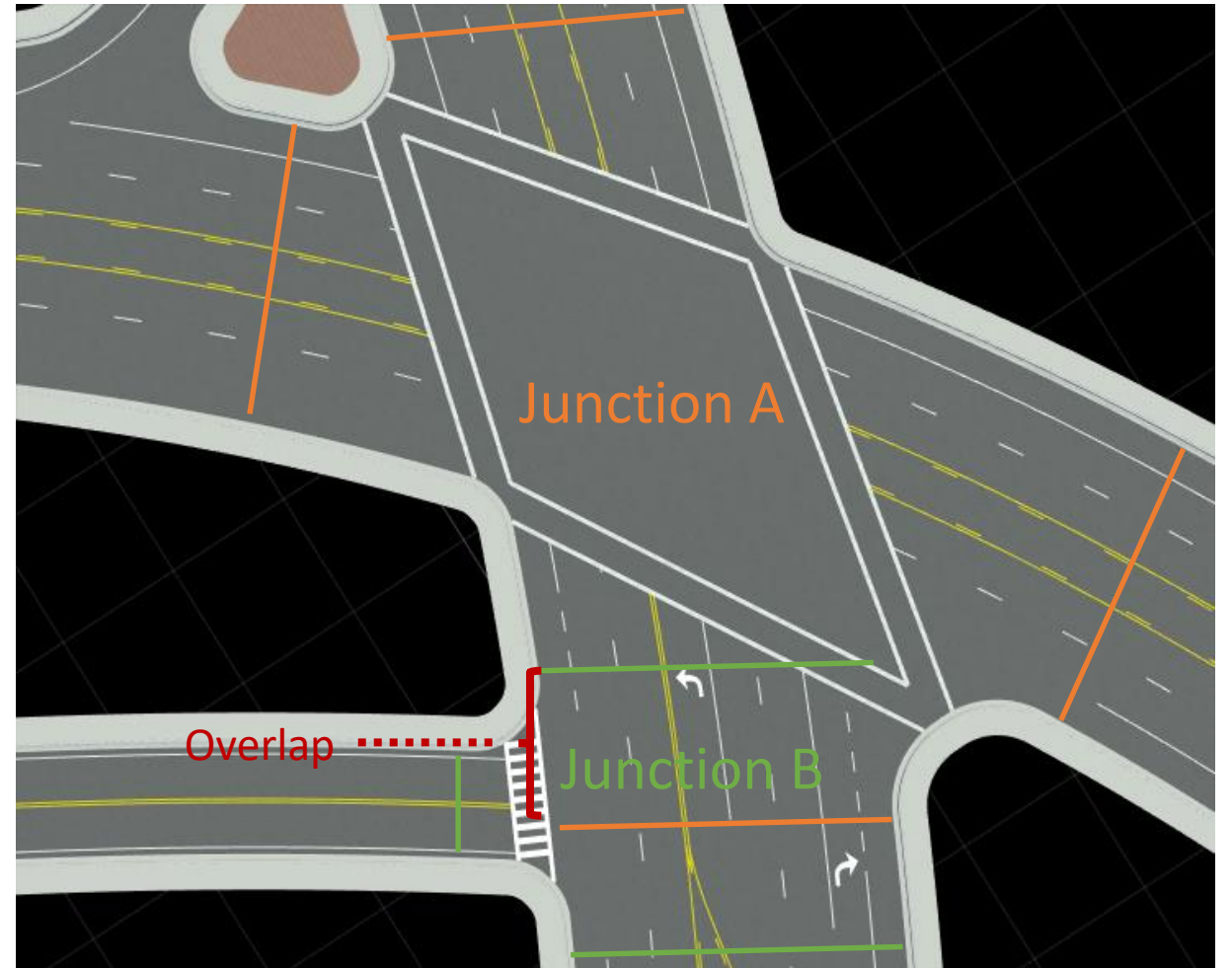
Unified Topology Model - Junctions

- Junctions group roads together
- Store a list of contained roads
- Store a list of the 'perimeter' nodes (with indication of interior side)



Overlapping Junctions

- Currently, junctions that get 'too close' must be combined
- Combinatorial explosion of junction paths



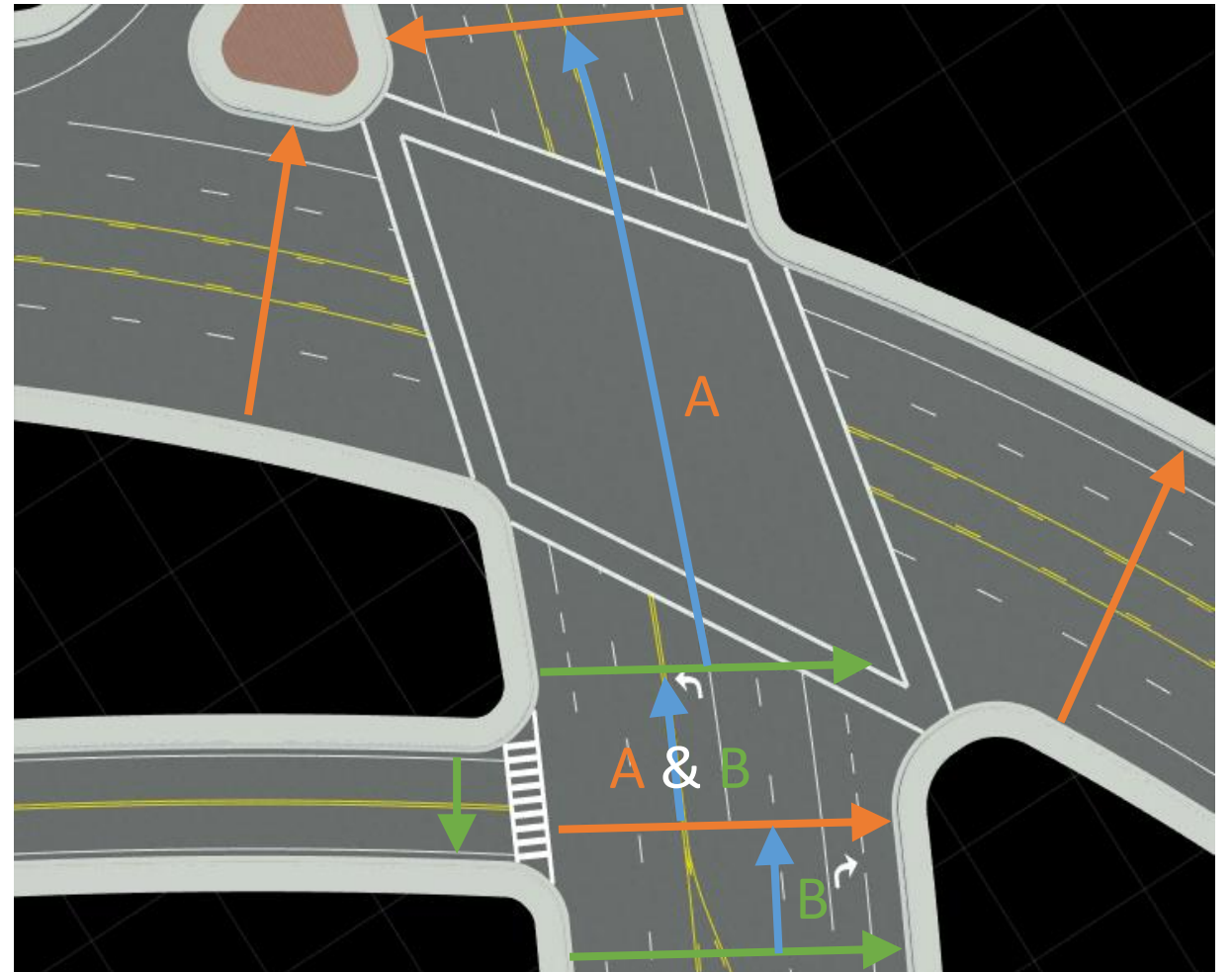
Overlapping Junctions

- Unified topology model makes combining junctions much easier (no need to concatenate paths)



Overlapping Junctions

- Alternatively (our approach), allow overlapping junctions
- One junction's perimeter node may be another's interior node
- Roads can belong to multiple junctions



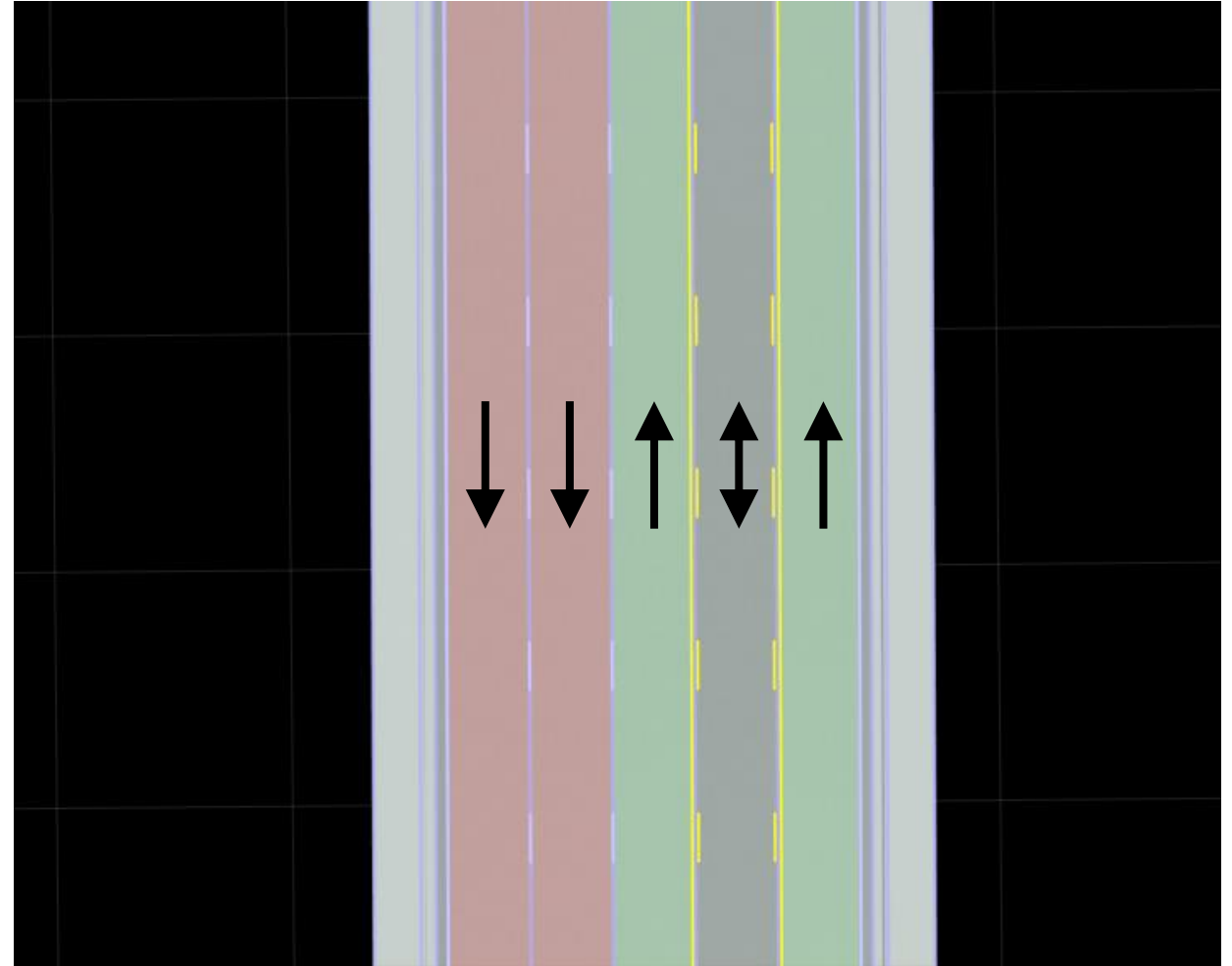
One more suggestion...

(for now)



Lane Travel Directions

- Introduce (optional?) lane travel directions
- Requiring 'right' and 'left' lanes to have similar travel directions imposes difficulties on map producers
 - Need to slice roads in junctions
 - Need to slice if >2 travel directions
 - Etc.



Thank You!

alex.goldberg@vectorzeroinc.com

www.vectorzeroinc.com

