

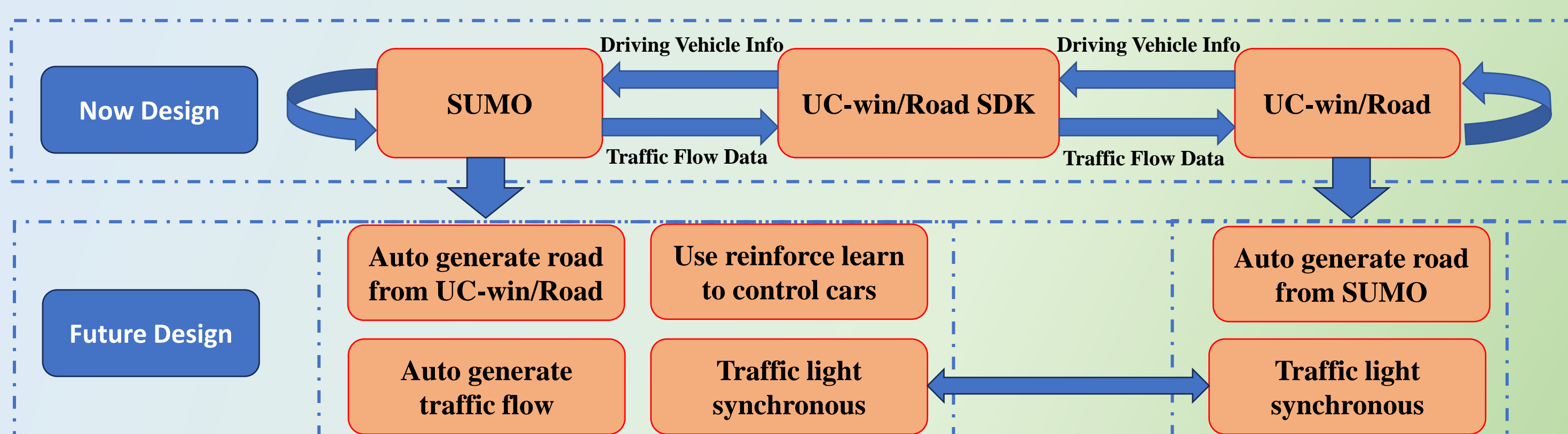
The Interface between UC-win/Road and SUMO

1. Development Background

When we use the UC-win/Road to do simulations, we can control the driving car and can not control the traffic flow. And the traffic flow in UC-win/Road is a little simple, which can not compare with the complex real-world environment. The focus of UC-win/Road is on realistic scenario modeling. Although the UC-win/Road develop the interface between UC-win/Road and VISSIM, the VISSIM is not open access. So, the range of road networks that can be built is limited in VISSIM and less customized for traffic flow and simulation.

SUMO(Simulation of Urban Mobility) is free and open access software, which can generate various traffic flow. But when we use SUMO to perform traffic flow simulations, we can only control the traffic flow not the driving car. And SUMO can not restore the real traffic environment. In this way, only theoretical traffic flow simulation can be carried out, not the actual driving scene.

We can combine SUMO and UC-win/Road, in which way we can implement the driving car and traffic flow combination simulation.



2. Basic Development in SUMO

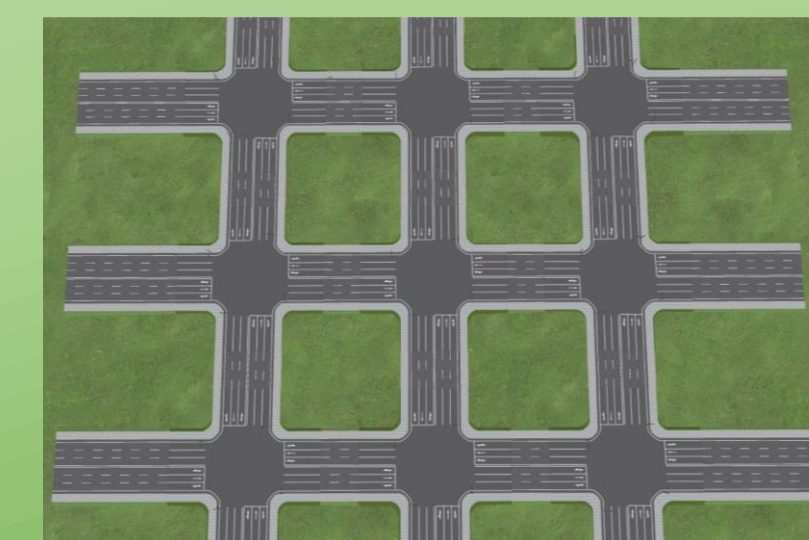
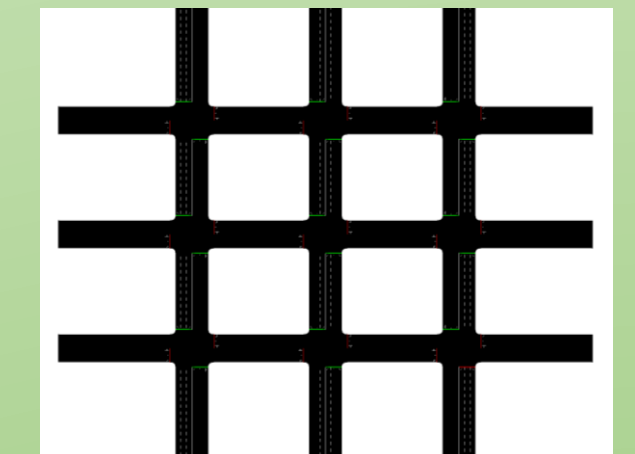
Before we secondarily develop the SUMO, we should set the environment variables in windows, to which we should add the SUMO/bin path.

After completing the basic traffic network design and traffic flow generation, it is necessary to simulate the traffic flow. Since the corresponding programming languages and design details in SUMO and UC-win/Road are different, it is necessary to simulate the traffic flow in SUMO and UC-win/Road.



3. Basic Development in UC-win/Road Software

As a joint simulation with SUMO is required, it is necessary to create the same road network data as in the SUMO simulation. The creation of road network data in UC-win/Road is similar to that in SUMO. There are two ways to create a road network. The first method is to manually create and edit the road network using the built-in editor in UC-win/Road. The second method is to use OSM data to generate road network data in UC-win/Road. In the secondary development of UC-win/Road, we need to use Forum8's UC-win/Road SDK, and the development language used is Delphi language. In the secondary development of software, it is necessary to design good interactive interfaces and functional programs.



4. UC-win/Road Jointly Developed with SUMO

After completing the development of the SUMO part and the UC-win/Road part, they need to be combined for interactive development. The joint development is mainly divided into three parts. The first part is to simulate the reception of driving vehicle data from UC-win/Road in SUMO. The second part is to receive traffic flow data from SUMO in UC-win/Road. The third part is that SUMO receives the driving simulation data and transmits it to UC-win/Road, and UC-win/Road receives the traffic flow data and sends the driving simulation data.

