CLAIMS

1. A traffic simulation method, comprising:

acquiring traffic simulation initialization data, which comprises one or more of road attribute information, moving object attribute information, and moving object travel information;

performing a road-based traffic simulation based on the traffic simulation initialization data; and

outputting a traffic simulation result,

wherein performing the road-based traffic simulation based on the traffic simulation initialization data further comprises:

acquiring attribute information of an adjacent traffic simulation calculation node corresponding to a next adjacent traffic area in a moving direction of a moving object, in response to detecting that the moving object leaves a traffic area corresponding to a preset traffic simulation calculation node;

establishing a communication between the preset traffic simulation calculation node and the adjacent traffic simulation calculation node, based on the attribute information of the adjacent traffic simulation calculation node; and

sending traffic simulation data related to the moving object having moved to the next adjacent traffic area to the adjacent traffic simulation calculation node.

2. The method according to claim 1, wherein performing the road-based traffic simulation based on the traffic simulation initialization data comprises:

determining a traffic simulation calculation node;

acquiring traffic area road attribute information, moving object attribute information and moving object travel information corresponding to the traffic simulation calculation node; and

determining a traffic simulation model, and performing a node-parallel traffic simulation using the traffic simulation model based on the traffic area road attribute information, the moving object attribute information and the moving object travel information.

~~3. The method according to claim 2, wherein performing the road-based traffic simulation based on the traffic simulation initialization data further comprises:~~

~~acquiring attribute information of an adjacent traffic simulation calculation node corresponding to a next adjacent traffic area in a moving direction of a moving object, in response to detecting that the moving object leaves a traffic area corresponding to a preset traffic simulation calculation node;~~

~~establishing a communication between the preset traffic simulation calculation node and the adjacent traffic simulation calculation node, based on the attribute information of the adjacent traffic simulation calculation node; and~~

~~sending traffic simulation data related to the moving object having moved to the next adjacent traffic area to the adjacent traffic simulation calculation node.~~

~~4~~3. The method according to ~~any one of~~ claim~~s~~ 1 ~~to 3~~or 2, wherein outputting the traffic simulation result comprises:

outputting the traffic simulation result at a preset simulation time interval.

~~5~~4. The method according to claim ~~4~~3, wherein outputting the traffic simulation result at the preset simulation time interval comprises:

collecting traffic simulation data generated by the traffic simulation calculation node to obtain a traffic simulation data packet, in response to expiration of the preset simulation time interval; and

performing a preset aggregation process on the traffic simulation data packet to obtain the traffic simulation result.

~~6~~5. The method according to ~~any one of~~ claim~~s~~ 2 ~~to 5~~or 4, further comprising:

updating, in response to receipt of traffic area road update information, the traffic area road attribute information and related traffic area road data in the traffic simulation calculation node based on the traffic area road update information.

~~7~~6. The method according to ~~any one of~~ claim~~s~~ 2 ~~to 6~~or 4, further comprising:

performing a time alignment management for the traffic simulation calculation node.

~~8~~7. The method according to ~~any one of~~ claim~~s~~ 1 ~~to 7~~, further comprising executing, based on the traffic simulation result, at least one of:

a traffic facility control, a dynamically variable lane setting, a traffic guidance, a traffic flow restriction, or a navigation data adjustment.

~~9~~8. A traffic simulation apparatus, comprising:

an acquisition module configured to acquire traffic simulation initialization data which comprises one or more of road attribute information, moving object attribute information, and moving object travel information;

a simulation module configured to perform a road-based traffic simulation based on the traffic simulation initialization data; and

an output module configured to output a traffic simulation result,

wherein the simulation module further comprises:

a second acquisition sub-module configured to acquire attribute information of an adjacent traffic simulation calculation node corresponding to a next adjacent traffic area in a moving direction of a moving object, in response to detecting that the moving object leaves a traffic area corresponding to a preset traffic simulation calculation node;

an establishing sub-module configured to establish a communication between the preset traffic simulation calculation node and the adjacent traffic simulation calculation node, based on the attribute information of the adjacent traffic simulation calculation node; and

a transmission sub-module configured to send traffic simulation data related to the moving object having moved to the next adjacent traffic area to the adjacent traffic simulation calculation node.

~~10~~9. The apparatus according to claim ~~9~~8, wherein the simulation module comprises:

a determination sub-module configured to determine a traffic simulation calculation node;

a first acquisition sub-module configured to acquire traffic area road attribute information, moving object attribute information and moving object travel information corresponding to the traffic simulation calculation node; and

a simulation sub-module configured to determine a traffic simulation model, and perform a node-parallel traffic simulation using the traffic simulation model based on the traffic area road attribute information, the moving object attribute information and the moving object travel information.

~~11. The apparatus according to claim 10, wherein the simulation module further comprises:~~

~~a second acquisition sub-module configured to acquire attribute information of an adjacent traffic simulation calculation node corresponding to a next adjacent traffic area in a moving direction of a moving object, in response to detecting that the moving object leaves a traffic area corresponding to a preset traffic simulation calculation node;~~

~~an establishing sub-module configured to establish a communication between the preset traffic simulation calculation node and the adjacent traffic simulation calculation~~

~~node, based on the attribute information of the adjacent traffic simulation calculation node; and~~

~~a transmission sub-module configured to send traffic simulation data related to the moving object having moved to the next adjacent traffic area to the adjacent traffic simulation calculation node.~~

~~12~~10. The apparatus according to ~~any one of~~ claim~~s 9 to 11~~8 or 9, wherein the output module is configured to:

output a traffic simulation result at a preset simulation time interval.

~~13~~11. The apparatus according to claim ~~12~~10, wherein the output module comprises:

a collection sub-module configured to collect traffic simulation data generated by the traffic simulation calculation node to obtain a traffic simulation data packet, in response to expiration of the preset simulation time interval; and

a processing sub-module configured to perform a preset aggregation process on the traffic simulation data packet to obtain the traffic simulation result.

~~14~~12. The apparatus according to ~~any one of~~ claim~~s 10 to 13~~ 9 or 11, further comprising:

an updating module configured to update, in response to receipt of traffic area road update information, the traffic area road attribute information and related traffic area road data in the traffic simulation calculation node based on the traffic area road update information.

~~15~~13. The apparatus according to ~~any one of~~ claim~~s 10 to 14~~ 9 or 11, further comprising:

a management module configured to perform a time alignment management for the traffic simulation calculation node.

~~16~~14. The apparatus according to ~~any one of claims 9 to 15~~claim 9, further comprising:

an execution module configured to execute, based on the traffic simulation result, at least one of:

a traffic facility control, a dynamically variable lane setting, a traffic guidance, a traffic flow restriction, or a navigation data adjustment.

~~17~~15. A traffic simulation system, comprising:

a memory configured to store and update traffic simulation initialization data, and provide corresponding requested data in response to a data acquisition request, wherein the

traffic simulation initialization data comprises one or more of road attribute information, moving object attribute information and moving object travel information;

a traffic simulation calculation cluster coupled to the memory, and configured to perform a road-based traffic simulation based on the traffic simulation initialization data, wherein the traffic simulation calculation cluster comprises two or more traffic simulation calculation nodes; and

an aggregation server coupled to the traffic simulation calculation cluster, and configured to aggregate traffic simulation data of the traffic simulation calculation cluster and output a traffic simulation result,

wherein the traffic simulation calculation node is further configured to:

acquire attribute information of an adjacent traffic simulation calculation node corresponding to a next adjacent traffic area in a moving direction of a moving object, in response to detecting that the moving object leaves a traffic area corresponding to a preset traffic simulation calculation node;

establish a communication between the preset traffic simulation calculation node and the adjacent traffic simulation calculation node, based on the attribute information of the adjacent traffic simulation calculation node; and

send traffic simulation data related to the moving object having moved to the next adjacent traffic area to the adjacent traffic simulation calculation node.

~~18~~16. The system according to claim ~~17~~15, wherein the two or more traffic simulation calculation nodes perform a region-parallel simulation for the respective traffic areas.

~~19. The system according to claim 18, wherein the traffic simulation calculation node is further configured to:~~

~~acquire attribute information of an adjacent traffic simulation calculation node corresponding to a next adjacent traffic area in a moving direction of a moving object, in response to detecting that the moving object leaves a traffic area corresponding to a preset traffic simulation calculation node;~~

~~establish a communication between the preset traffic simulation calculation node and the adjacent traffic simulation calculation node, based on the attribute information of the adjacent traffic simulation calculation node; and~~

~~send traffic simulation data related to the moving object having moved to the next adjacent traffic area to the adjacent traffic simulation calculation node.~~

~~20~~17. The system according to ~~any one of~~ claim~~s 17 to 19~~ 15 or 16, wherein the

memory comprises:

a name server configured to store the road attribute information; and

a simulation memory configured to store the moving object attribute information and the moving object travel information.

~~21~~18. The system according to claim ~~20~~17, wherein the name server is a master-slave backup server.

~~22~~19. The system according to ~~any one of~~ claim~~s 17 to 21~~ 16 or 18, wherein the memory is further configured to update, in response to receipt of road update information, the road attribute information based on the road update information; and

the traffic simulation calculation node is further configured to update, in response to receipt of the road update information, related traffic area road data based on the road update information.

~~23~~20. The system according to ~~any one of~~ claim~~s 17 to 21~~ 16 or 18, wherein the aggregation server is further configured to output a traffic simulation result at a preset simulation time interval.

~~24~~21. The system according to claim ~~23~~20, wherein the aggregation server is configured to:

collect traffic simulation data generated by the traffic simulation calculation node to obtain a traffic simulation data packet, in response to expiration of the preset simulation time interval; and

perform a preset aggregation process on the traffic simulation data packet to obtain the traffic simulation result.

~~25~~22. The system according ~~to any one of~~ claim~~s 17 to 24~~ 15, further comprising:

a clock synchronization server coupled to the traffic simulation calculation cluster and/or the aggregation server, and configured to perform a time alignment management for data in the traffic simulation calculation node and/or the aggregation server.

~~26~~23. An electronic device, comprising a memory and a processor, wherein

the memory is configured to store one or more computer instructions, which are executed by the processor to implement the steps in the method according to any one of claims 1 to ~~8~~7.

~~27~~24. A computer-readable storage medium storing computer instructions which implement, when executed by a processor, the steps in the method according to any one of claims 1 to ~~8~~7.