

CLAIMS

1. A container planning method, comprising:

acquiring (S201) a freight demand information set of a target journey, wherein the target journey comprises a plurality of freight nodes, and the freight demand information set comprises container demand information of each of the plurality of freight nodes;

acquiring (S202) an available-container information set of the target journey, wherein the available-container information set comprises available-container information of each of the plurality of freight nodes;

acquiring (S203) an in-transit container information set of the target journey, wherein the in-transit container information set comprises in-transit container information of each of the plurality of freight nodes;

determining (S204), based on the container demand information set, the available-container information set and the in-transit container information set, a planning scheme set for usage of containers in the target journey, wherein each planning scheme for the usage of containers in the planning scheme set comprises combinations of selected containers and a holder target corresponding to each container in each of the combinations of selected containers; and

determining (S205) a target container planning scheme in the planning scheme set as a container planning scheme of the target journey, wherein a preset container parameter of combinations of selected containers in the target container planning scheme is optimal in the planning scheme set, and a preset holder target parameter of a holder target corresponding to the combinations of selected containers in the target container planning scheme is optimal in the planning scheme set.

2. The container planning method according to claim 1, wherein the acquiring (S202) an available-container information set of the target journey comprises:

acquiring a service constraint table preset for the target journey;

acquiring initial available-container information of each of the plurality of freight nodes; and

determining, based on the service constraint table and the initial available-container information of each of the plurality of freight nodes, the available-container information set of the target journey, wherein each available-container information in the available-container information set comprises an available container set and a quantity limiting interval of the available container set.

3. The container planning method according to claim 1, wherein the determining (S204), based on the container demand information set, the available-container information set and the in-transit container information set, a planning scheme set for usage of containers in the target journey comprises:

determining (S301), based on the container demand information set, the available-container information set and the in-transit container information set, a planning scheme for usage of a first container at a first freight node in the plurality of freight nodes;

determining (S302), based on container usage information in the planning scheme for usage of the first container, a planning scheme for usage of a second container, corresponding to a second freight node after the first freight node; and

determining (S303), based on the planning scheme for usage of the first container and the planning scheme for usage of the second container, the planning scheme set for usage of the containers in the target journey.

4. The container planning method according to claim 3, wherein the determining (S301), based on the container demand information set, the available-container information set and the in-transit container information set, a planning scheme for usage of a first container at a first freight node in the plurality of freight nodes comprises:

performing initial sorting, based on a first preset requirement, to a first container demand information set, corresponding to the first freight node in the plurality of freight nodes, in the container demand information set and a first available-container information set, corresponding to the first freight node, in the available-container information set;

determining, based on the first container demand information set, a first reusing container information set corresponding to reusing containers available at the first freight node in the in-transit container information set; and

determining, based on the first container demand information set and the first available-container information set after the initial sorting and the first reusing container information set, the planning scheme for usage of the first container at the first freight node in the plurality of freight nodes.

5. The container planning method according to claim 4, wherein the determining, based on the first container demand information set and the first available-container information set after the initial sorting and the first reusing container information set, the planning scheme for usage of the first container at the first freight node in the plurality of freight nodes comprises:

matching, based on a departure time parameter of each available-container information in the first available-container information set and a correspondence between a ship-from address

and a ship-to address, target container demand information in the first container demand information set with the first available-container information set to obtain a plurality of first matching results;

respectively matching, based on a second preset requirement, each of the plurality of first matching results with the first reusing container information set to obtain a plurality of second matching results of combinations of selected containers;

acquiring a scoring function set corresponding to the plurality of second matching results of the combinations of selected containers, wherein each scoring function in the scoring function set comprises a constraint score and a target score, the constraint score is a sum of differences between a quantity of available containers and an upper and a lower limit constraint, and the target score is the preset container parameter and the preset holder target parameter corresponding to each of the plurality of second matching results;

performing sorting to the constraint score and the target score of each scoring function in the scoring function set to obtain a sorting result; and

determining, based on the sorting result, the planning scheme for usage of the first container at the first freight node in the plurality of freight nodes.

6. The container planning method according to claim 3, wherein the determining (S302), based on container usage information in the planning scheme for usage of the first container, a planning scheme for usage of a second container, corresponding to a second freight node after the first freight node comprises:

updating, based on the container usage information in the planning scheme for usage of the first container, in-transit container information of the second freight node after the first freight node to obtain updated target in-transit container information, wherein the container usage information is container information selected by the planning scheme for usage of the first container;

performing initial sorting, based on a third preset requirement, to a second container demand information set, corresponding to the second freight node in the plurality of freight nodes, in the container demand information set and a second available-container information set, corresponding to the second freight node, in the available-container information set;

determining, based on the second container demand information set, a second reusing container information set corresponding to reusing containers available at the second freight node in the target in-transit container information; and

determining, based on the second container demand information set and the second available-container information set after the initial sorting and the second reusing container

information set, the planning scheme for usage of the second container at the second freight node in the plurality of freight nodes.

7. The container planning method according to claim 3, wherein after the determining (S303), based on container usage information in the planning scheme for usage of the first container, a planning scheme for usage of a second container, corresponding to a second freight node after the first freight node, the method further comprises:

determining, based on container usage information in the planning scheme for usage of the second container, a planning scheme for usage of a third container, corresponding to the third freight node after the second freight node; and

determining, based on the planning scheme for usage of the first container, the planning scheme for usage of the second container, and the planning scheme for usage of the third container, the planning scheme set for usage of the containers in the target journey.

8. The container planning method according to claim 1, wherein the determining (S205) a target container planning scheme in the planning scheme set comprises:

inputting the planning scheme set into a preset local search model, and taking a solution output by the local search model as the target container planning scheme.

9. A container planning apparatus (400), comprising:

a first acquiring unit (401), configured to acquire a freight demand information set of a target journey, wherein the target journey comprises a plurality of freight nodes, and the freight demand information set comprises container demand information of each of the plurality of freight nodes;

a second acquiring unit (402), configured to acquire an available-container information set of the target journey, wherein the available-container information set comprises available-container information of each of the plurality of freight nodes;

a third acquiring unit (403), configured to acquire an in-transit container information set of the target journey, wherein the in-transit container information set comprises in-transit container information of each of the plurality of freight nodes;

a first determining unit (404), configured to determine, based on the container demand information set, the available-container information set and the in-transit container information set, a planning scheme set for usage of containers in the target journey, wherein each planning scheme for the usage of containers in the planning scheme set comprises combinations of selected containers and a holder target corresponding to each container in each of the combinations of selected containers; and

a second determining unit (405), configured to determine a target container planning

scheme in the planning scheme set as a container planning scheme of the target journey, wherein a preset container parameter of combinations of selected containers in the target container planning scheme is optimal in the planning scheme set, and a preset holder target parameter of a holder target corresponding to the combinations of selected containers in the target container planning scheme is optimal in the planning scheme set.

10. A server, comprising:

one or more processors (501);

a memory (502); and

one or more application programs, wherein the one or more application programs are stored in the memory and configured to be executed by the one or more processors to perform following steps:

acquiring (S201) a freight demand information set of a target journey, wherein the target journey comprises a plurality of freight nodes, and the freight demand information set comprises container demand information of each of the plurality of freight nodes;

acquiring (S202) an available-container information set of the target journey, wherein the available-container information set comprises available-container information of each of the plurality of freight nodes;

acquiring (S203) an in-transit container information set of the target journey, wherein the in-transit container information set comprises in-transit container information of each of the plurality of freight nodes;

determining (S204), based on the container demand information set, the available-container information set and the in-transit container information set, a planning scheme set for usage of containers in the target journey, wherein each planning scheme for the usage of containers in the planning scheme set comprises combinations of selected containers and a holder target corresponding to each container in each of the combinations of selected containers; and

determining (S205) a target container planning scheme in the planning scheme set as a container planning scheme of the target journey, wherein a preset container parameter of combinations of selected containers in the target container planning scheme is optimal in the planning scheme set, and a preset holder target parameter of a holder target corresponding to the combinations of selected containers in the target container planning scheme is optimal in the planning scheme set.

11. The server according to claim 10, wherein the acquiring (S202) an available-container information set of the target journey comprises:

acquiring a service constraint table preset for the target journey;
acquiring initial available-container information of each of the plurality of freight nodes;
and

determining, based on the service constraint table and the initial available-container information of each of the plurality of freight nodes, the available-container information set of the target journey, wherein each available-container information in the available-container information set comprises an available container set and a quantity limiting interval of the available container set.

12. The server according to claim 10, wherein the determining (S204), based on the container demand information set, the available-container information set and the in-transit container information set, a planning scheme set for usage of containers in the target journey comprises:

determining (S301), based on the container demand information set, the available-container information set and the in-transit container information set, a planning scheme for usage of a first container at a first freight node in the plurality of freight nodes;

determining (S302), based on container usage information in the planning scheme for usage of the first container, a planning scheme for usage of a second container, corresponding to a second freight node after the first freight node; and

determining (S302), based on the planning scheme for usage of the first container and the planning scheme for usage of the second container, the planning scheme set for usage of the containers in the target journey.

13. A computer-readable storage medium, wherein a computer program is stored on the computer-readable storage medium, and the computer program is loaded by a processor to perform following steps:

acquiring (S201) a freight demand information set of a target journey, wherein the target journey comprises a plurality of freight nodes, and the freight demand information set comprises container demand information of each of the plurality of freight nodes;

acquiring (S202) an available-container information set of the target journey, wherein the available-container information set comprises available-container information of each of the plurality of freight nodes;

acquiring (S203) an in-transit container information set of the target journey, wherein the in-transit container information set comprises in-transit container information of each of the plurality of freight nodes;

determining (S204), based on the container demand information set, the available-

container information set and the in-transit container information set, a planning scheme set for usage of containers in the target journey, wherein each planning scheme for the usage of containers in the planning scheme set comprises combinations of selected containers and a holder target corresponding to each container in each of the combinations of selected containers; and

determining (S205) a target container planning scheme in the planning scheme set as a container planning scheme of the target journey, wherein a preset container parameter of combinations of selected containers in the target container planning scheme is optimal in the planning scheme set, and a preset holder target parameter of a holder target corresponding to the combinations of selected containers in the target container planning scheme is optimal in the planning scheme set.

14. The computer-readable storage medium according to claim 13, wherein the acquiring (S202) an available-container information set of the target journey comprises:

acquiring a service constraint table preset for the target journey;

acquiring initial available-container information of each of the plurality of freight nodes; and

determining, based on the service constraint table and the initial available-container information of each of the plurality of freight nodes, the available-container information set of the target journey, wherein each available-container information in the available-container information set comprises an available container set and a quantity limiting interval of the available container set.

15. The computer-readable storage medium according to claim 13, wherein the determining (S204), based on the container demand information set, the available-container information set and the in-transit container information set, a planning scheme set for usage of containers in the target journey comprises:

determining (S301), based on the container demand information set, the available-container information set and the in-transit container information set, a planning scheme for usage of a first container at a first freight node in the plurality of freight nodes;

determining (S302), based on container usage information in the planning scheme for usage of the first container, a planning scheme for usage of a second container, corresponding to a second freight node after the first freight node; and

determining (S303), based on the planning scheme for usage of the first container and the planning scheme for usage of the second container, the planning scheme set for usage of the containers in the target journey.

16. The computer-readable storage medium according to claim 15, wherein the determining (S301), based on the container demand information set, the available-container information set and the in-transit container information set, a planning scheme for usage of a first container at a first freight node in the plurality of freight nodes comprises:

performing initial sorting, based on a first preset requirement, to a first container demand information set, corresponding to the first freight node in the plurality of freight nodes, in the container demand information set and a first available-container information set, corresponding to the first freight node, in the available-container information set;

determining, based on the first container demand information set, a first reusing container information set corresponding to reusing containers available at the first freight node in the in-transit container information set; and

determining, based on the first container demand information set and the first available-container information set after the initial sorting and the first reusing container information set, the planning scheme for usage of the first container at the first freight node in the plurality of freight nodes.

17. The computer-readable storage medium according to claim 16, wherein the determining, based on the first container demand information set and the first available-container information set after the initial sorting and the first reusing container information set, the planning scheme for usage of the first container at the first freight node in the plurality of freight nodes comprises:

matching, based on a departure time parameter of each available-container information in the first available-container information set and a correspondence between a ship-from address and a ship-to address, target container demand information in the first container demand information set with the first available-container information set to obtain a plurality of first matching results;

respectively matching, based on a second preset requirement, each of the plurality of first matching results with the first reusing container information set to obtain a plurality of second matching results of combinations of selected containers;

acquiring a scoring function set corresponding to the plurality of second matching results of the combinations of selected containers, wherein each scoring function in the scoring function set comprises a constraint score and a target score, the constraint score is a sum of differences between a quantity of available containers and an upper and a lower limit constraint, and the target score is the preset container parameter and the preset holder target parameter corresponding to each of the plurality of second matching results;

performing sorting to the constraint score and the target score of each scoring function in the scoring function set to obtain a sorting result; and

determining, based on the sorting result, the planning scheme for usage of the first container at the first freight node in the plurality of freight nodes.

18. The computer-readable storage medium according to claim 15, wherein the determining (S302), based on container usage information in the planning scheme for usage of the first container, a planning scheme for usage of a second container, corresponding to a second freight node after the first freight node comprises:

updating, based on the container usage information in the planning scheme for usage of the first container, in-transit container information of the second freight node after the first freight node to obtain updated target in-transit container information, wherein the container usage information is container information selected by the planning scheme for usage of the first container;

performing initial sorting, based on a third preset requirement, to a second container demand information set, corresponding to the second freight node in the plurality of freight nodes, in the container demand information set and a second available-container information set, corresponding to the second freight node, in the available-container information set;

determining, based on the second container demand information set, a second reusing container information set corresponding to reusing containers available at the second freight node in the target in-transit container information; and

determining, based on the second container demand information set and the second available-container information set after the initial sorting and the second reusing container information set, the planning scheme for usage of the second container at the second freight node in the plurality of freight nodes.

19. The computer-readable storage medium according to claim 15, wherein after the determining (S303), based on container usage information in the planning scheme for usage of the first container, a planning scheme for usage of a second container, corresponding to a second freight node after the first freight node, the method further comprises:

determining, based on container usage information in the planning scheme for usage of the second container, a planning scheme for usage of a third container, corresponding to the third freight node after the second freight node; and

determining, based on the planning scheme for usage of the first container, the planning scheme for usage of the second container, and the planning scheme for usage of the third container, the planning scheme set for usage of the containers in the target journey.

20. The computer-readable storage medium according to claim 13, wherein the determining (S205) a target container planning scheme in the planning scheme set comprises:
inputting the planning scheme set into a preset local search model, and taking a solution output by the local search model as the target container planning scheme.