CLAIMS

What is claimed is:

1. A content delivery network CDN system combined with an optical network terminal, wherein the system comprises:

a plurality of CDN edge nodes, wherein a first CDN edge node in the plurality of CDN edge nodes is configured to: receive a first content request sent by a first client, and when determining that the first CDN edge node does not cache target content requested by the first content request, send a first query request for the target content to an optical network control center;

the optical network control center, configured to notify, based on the first query request, the first CDN edge node to request the target content from a CDN central node, wherein

the first CDN edge node is configured to obtain the target content from the CDN central node; and

the optical network control center is further configured to send a content pull instruction for the target content cached in the first CDN edge node to N optical network terminals, wherein N is a positive integer greater than 0; and

the N optical network terminals, configured to: separately obtain, based on the content pull instruction, the target content from the first CDN edge node for caching, and separately send caching success notifications to the optical network control center, wherein

the optical network control center is further configured to record, based on the caching success notifications, that the N optical network terminals cache the target content.

2. The system according to claim 1, wherein

a second CDN edge node in the plurality of CDN edge nodes is configured to: receive a second content request sent by a second client, and when determining that the second CDN edge node does not cache the target content requested by the second content request, send a second query request for the target content to the optical network control center;

the optical network control center is further configured to: determine, based on the second query request, that the optical network control center records that the N optical network terminals cache the target content, select a target optical network terminal from the N optical network terminals, and send access information of the target optical network terminal to the second CDN edge node; and

the second CDN edge node is further configured to send the access information to the second client, wherein the access information indicates the second client to obtain the target content from the target optical network terminal.

3. The system according to claim 2, wherein

the optical network control center is configured to select the target optical network terminal from the N optical network terminals based on one or any combination of load, used downlink bandwidth, total quantities of cached content, storage space, and central processing unit CPU usage of the N optical network terminals.

4. The system according to any one of claims 1 to 3, wherein the optical network control center is connected to K optical network terminals; and

the optical network control center is further configured to: synchronize a quantity of request times of the target content with the plurality of CDN edge nodes, and select the N optical network terminals from the K optical network terminals based on the quantity of request times, wherein a larger quantity of request times indicates a larger value of N, and K is a positive integer greater than N.

5. The system according to any one of claims 1 to 4, wherein

the first CDN edge node is configured to cache the target content after obtaining the target content from the CDN central node, and send the target content to the first client.

6. A content delivery network CDN system combined with an optical network terminal, wherein the system comprises:

a plurality of CDN edge nodes, wherein a second CDN edge node in the plurality of CDN edge nodes is configured to: receive a second content request sent by a second client, and when determining that the second CDN edge node does not cache target content requested by the second content request, send a second query request for the target content to an optical network control center; and

the optical network control center, configured to: determine, based on the second query request, that the optical network control center records that N optical network terminals cache the target content, select a target optical network terminal from the N optical network terminals, and send access information of the target optical network terminal to the second CDN edge node, wherein

the second CDN edge node is further configured to send the access information to the second client, wherein the access information indicates the second client to obtain the target content from the target optical network terminal.

7. The system according to claim 6, wherein

the optical network control center is configured to: be connected to K optical network terminals, synchronize a quantity of request times of the target content with the plurality of CDN edge nodes, and select the N optical network terminals from the K optical network terminals based on the quantity of request times, wherein a larger quantity of request times indicates a larger value of N, and K is a positive integer greater than N.

8. The system according to claim 6 or 7, wherein

a first CDN edge node is configured to cache the target content after obtaining the target content from a CDN central node, and send the target content to a first client.

9. A content delivery method based on an optical network terminal, wherein the method comprises:

receiving, by the optical network terminal, a content pull instruction that is sent by an optical network control center and that is for target content cached in a first CDN edge node, obtaining the target content from the first CDN edge node for caching, and sending a caching success notification to the optical network control center; and

receiving, by the optical network terminal, a target content obtaining request sent by a second client, and sending the target content to the second client based on the target content obtaining request.

10. A content delivery method based on an optical network control center, wherein the method comprises:

receiving, by the optical network control center, a first query request that is sent by a first CDN edge node and that is for target content;

notifying, by the optical network control center based on the first query request, the first CDN edge node to request the target content from a CDN central node;

sending, by the optical network control center, a content pull instruction for the target content cached in the first CDN edge node to N optical network terminals, wherein N is a positive integer greater than 0; and

recording, by the optical network control center based on caching success notifications sent by the N optical network terminals, that the N optical network terminals cache the target content.

11. The method according to claim 10, wherein the method further comprises:

receiving, by the optical network control center, a second query request that is sent by a second CDN edge node and that is for the target content; and

determining, by the optical network control center based on the second query request, that the optical network control center records that the N optical network terminals cache the target content, selecting a target optical network terminal from the N optical network terminals, and sending access information of the target optical network terminal to the second CDN edge node.

12. The method according to claim 11, wherein the selecting, by the optical network control center, a target optical network terminal from the N optical network terminals comprises:

selecting, by the optical network control center, the target optical network terminal from the N optical network terminals based on one or any combination of load, used downlink bandwidth, total quantities of cached content, storage space, and central processing unit CPU usage of the N

optical network terminals.

13. The method according to any one of claims 10 to 12, wherein the optical network control center is connected to K optical network terminals, and the method further comprises:

synchronizing, by the optical network control center, a quantity of request times of the target content with a plurality of CDN edge nodes, and selecting the N optical network terminals from the K optical network terminals based on the quantity of request times, wherein a larger quantity of request times indicates a larger value of N, and K is a positive integer greater than N.

14. An optical network terminal, wherein the optical network terminal comprises:

a receiving module, configured to: receive a content pull instruction that is sent by an optical network control center and that is for target content cached in a first CDN edge node, and obtain the target content from the first CDN edge node for caching; and

a sending module, configured to send a caching success notification to the optical network control center, wherein

the receiving module is further configured to receive a target content obtaining request sent by a second client; and

the sending module is further configured to send the target content to the second client based on the target content obtaining request.

15. An optical network control center, wherein the optical network control center comprises:

a receiving module, configured to receive a first query request that is sent by a first CDN edge node and that is for target content;

a sending module, configured to notify, based on the first query request, the first CDN edge node to request the target content from a CDN central node, wherein

the sending module is further configured to send a content pull instruction for the target content cached in the first CDN edge node to N optical network terminals, wherein N is a positive integer greater than 0; and

the receiving module is further configured to receive caching success notifications sent by the N optical network terminals; and

a processing module, configured to record, based on the caching success notifications, that the N optical network terminals cache the target content.

16. The optical network control center according to claim 15, wherein

the receiving module is further configured to receive a second query request that is sent by a second CDN edge node and that is for the target content;

the processing module is further configured to: determine, based on the second query request, that the processing module records that the N optical network terminals cache the target content, and select a target optical network terminal from the N optical network terminals; and

the sending module is further configured to send access information of the target optical network terminal to the second CDN edge node.

17. The optical network control center according to claim 16, wherein the processing module is configured to select the target optical network terminal from the N optical network terminals based on one or any combination of load, used downlink bandwidth, total quantities of cached content, storage space, and central processing unit CPU usage of the N optical network terminals.

18. The optical network control center according to any one of claims 15 to 17, wherein the optical network control center is connected to K optical network terminals, and the processing module is further configured to: synchronize a quantity of request times of the target content with a plurality of CDN edge nodes, and select the N optical network terminals from the K optical network terminals based on the quantity of request times, wherein a larger quantity of request times indicates a larger value of N, and K is a positive integer greater than N.

19. An optical network terminal, wherein the optical network terminal comprises a storage and a processor, wherein

the storage stores code, the processor is configured to execute the code, and when the code is executed, the optical network terminal performs the method according to claim 9.

20. An optical network control center, wherein the optical network control center comprises a storage and a processor, wherein

the storage stores code, the processor is configured to execute the code, and when the code is executed, the optical network control center performs the method according to any one of claims 10 to 13.