Content sharing network based on ICN and Multi-service Tag

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Background

• Internet resources are distributed unevenly.
  – In China, three national-wide giant network operators coexist with many small regional network operators.
  – CDN and cache systems are provided by these operators for each content providers.

• These small regional network operators encounter more difficulties than before with the video contributes the most of internet traffic
  – The investment for CDN and cache systems is higher and higher, and becomes too expensive to afford.
  – Inter-network settlements with giant network operators cost almost the half of its total revenue.
Business Motivation

- Small regional network operators wish to connect together and share resource
  - Sharing resource can reduce the inter-network traffic from giant operators and improve the efficiency of the CDN and cache systems
Limitations of existing technologies

• The requirement can be achieved by using existing technologies, i.e., content sharing can be based on IP addresses pool.

• However, there are some limitations and difficulties.
  – Regional network almost use private IP addresses, due to the lack of public IP addresses.
  – It’s impossible to track the content among different CDN in terms of its IP address.
  – The flow tag of IPv6 changes along with the specific traffic flow.

• Using URL for sharing content is ineffectual.
  – Video hosting sites use CDN with a range of servers to serve the same content. The same video on each of these hosts have different URLs.
The advantage of ICN

• ICN can evolve the Internet architecture to directly support information distribution by named data.
• ICN requires unique names for individual NDOs, since names are used for identifying objects independently of their location.
• With sufficiently unique hash-based identifiers, different applications could also share identical NDOs in a transparent way.
Design of content sharing network based on ICN

- According to ICN, we can interconnect regional networks by overlay structure;
- Regional network almost use private IP addresses. In order to share content resources, we need named data objects which are location independent;
- Multi-service Tag is designed according to named data objects.
- It can be used to schedule content resources to share among regional networks
Content sharing network using Multi-service Tag

- Edge server: interface with Regional networks content resources; make Multi-service Tags and upload them to control server; share resources and to be scheduled by Control server;
- Control server: receive the Multi-service Tags from each edge servers, schedule resources among edge servers.
Multi-Service Tag Design

- Multi-service tag is a scheme like URI hierarchy naming scheme follows certain principles
  - $\text{xlabels} = \text{base64}(\text{CID} + \text{content summary} + \text{type} + \text{random number} + \text{signature})$
  - It’s a string which identifies tags and encrypts the contained information using base64.
Next Step

• Welcome reviews.
• Seeking for suggestions on the follow-up.