Implementing Broadcast-based Self-learning Forwarding Strategy in NFD

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Need

- Self-learning is a common mechanism to find packet delivery paths, in **local area networks** and **mobile ad-hoc networks**,
- The main benefits of self-learning are its simplicity, adaptability, and support of mobility.
- The implementation of self-learning in NFD is beneficial for both application deployment and research.

Approach

The biggest challenge is to implement self-learning in NFD in a correct way with minimum changes to NFD.

- Non-discovery Interest Indication
  - Define the field in NDNLPv2 page; Declare the field in ndn-cxx library; Encode and decode the field in a LinkService.
- Prefix announcement
  - Define the field in NDNLPv2 page; Declare the field in ndn-cxx library; Encode and decode the field in a LinkService; APIs in Security module;
- Self-learning forwarding strategy
  - Private FIB: store learnt nexthop information in measurement table
    - each entry contains a list of next-hops, each nexthop contains the corresponding face and prefix announcement
  - Unit test for self-learning strategy
    - **Wired network scenario:** establish point-to-point links, check whether unicast was successful
    - **Wireless network scenario:** establish multicast links, check if node successfully switched to unicast face, whether unicast was successful

Achieved

Subject	Status	Owner	Project	Branch	Updated	Size	CR	CS	V
tests: Simple unit test for self-learning strategy		tianxiang li	NFD	master	1:31 PM			✗	✗
fw: measurement table for self-learning		ZHONGDA XIA	NFD	master	12:19 PM			✗	✗
strategy: Implement self-learning strategy		Muktadir Rahman Chowdhury	NFD	master	12:08 PM			✗	
face: encode/decode NonDiscovery and PrefixAnnouncement field in GenericLinkS...		Teng Liang	NFD	master	11:57 AM			✗	✗
lp: add PrefixAnnouncement field and tag		Teng Liang	ndn-cxx	master	11:25 AM		+1	✗	✗

Feature #4279

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Self-learning strategy

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Added by Junxiao Shi 3 months ago. Updated about 22 hours ago.

Status:	New	**Start date:**	09/27/2017
Priority:	Normal	**Due date:**	
Assignee:	Teng Liang	**% Done:**	50%
Category:	Forwarding	**Estimated time:**	18.00 h (Total: 30.00 h)
Target version:	v0.7	**Spent time:**	(Total: 0.50 h)

Description

Quote

Problems

- How to create Ethernet/UDP unicast Face creation on receiving multicast packet
- How to clean information stored in measurement table upon face removal

Any questions?