ForCES LFB Library Update
<draft-ietf-forces-lfb-lib-00 >

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Draft Status

- Discussions on
    - Conceptual Model
        - What is it for?
        - How to make?
    - XML definitions
        - Review on some LFB components, data types
        - Argue on LFB classifications

- Focus is conceptual model
    - To Add a section (may Section 4) called " IP Processing Conceptual model"

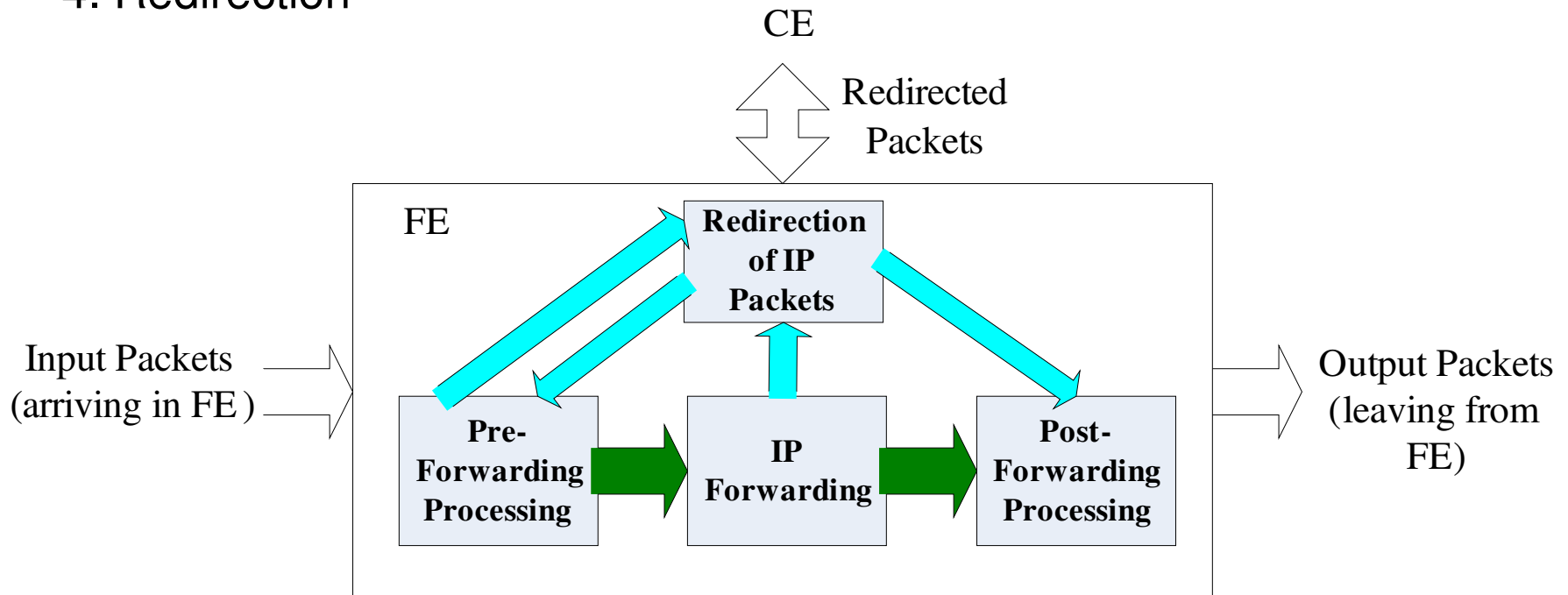- Update draft after the meeting

IP Processing Conceptual Model

The conceptual model will provide

- fundamental processing functions which should be supported by various IP packet processing；

- classification of IP processing functions, which should be relatively isolated;

- processing attributes, property, events which are common to all IP processing

- common processing order which is suitable for processing all IP packets；

- more?

IP Processing Stages

Basic 3 stages and a side stage:

1. Pre-forwarding processing
2. IP forwarding
3. Post-forwarding processing
4. Redirection

CE

Redirected Packets

FE

Redirection of IP Packets

Input Packets (arriving in FE)

Pre-Forwarding Processing

IP Forwarding

Post-Forwarding Processing
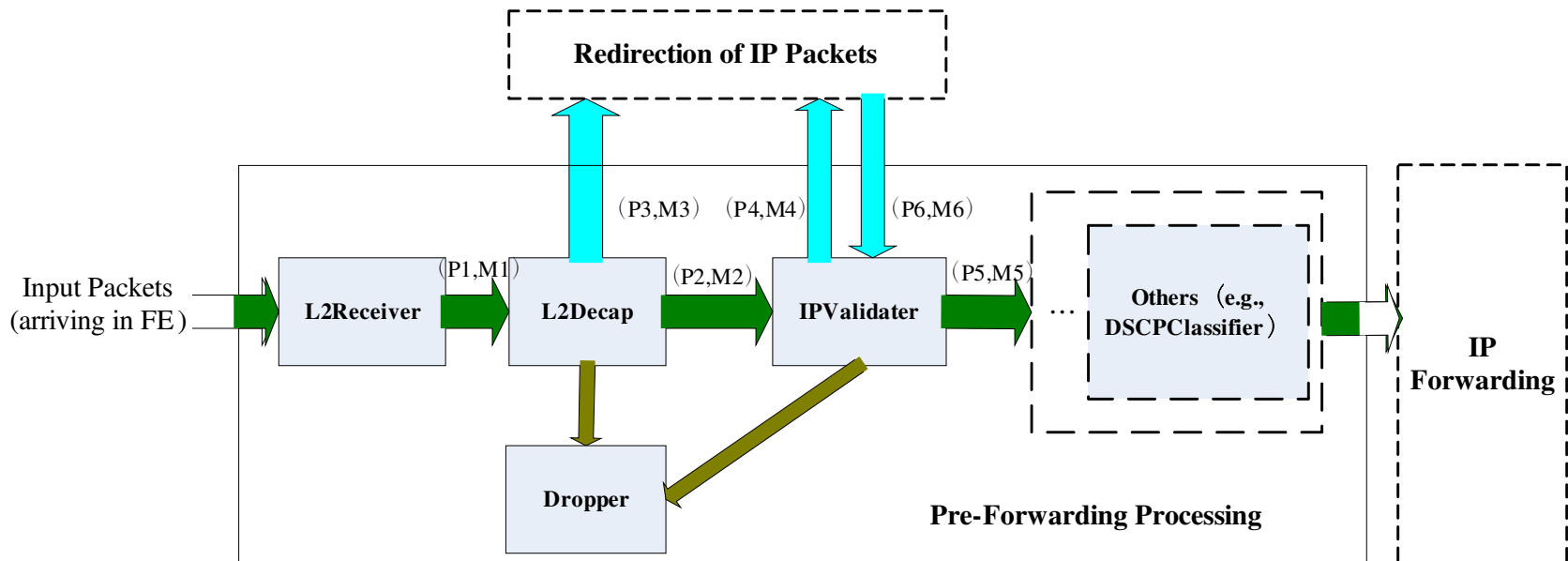
Output Packets (leaving from FE)

Pre-Forwarding Processing Stage

Basic functions:

1. Layer 2 packet Receiver
2. Layer 2 packet Decapsulation
3. IP packet Validating
4. Dropping
5. May include others? But should be universally fundamental.

Note that some Network Element (NE) may only include part of above functions, e.g., L2 switches may only include 1, 2?

Layer 2 Receiver

- L2Receiver receives and processes packets on Layer 2, may categorize into various types according to different layer 2 protocols
  - EtherReceiver
  - Other L2 receiver
- E.g., EtherReceiver
  - Function:receive ethernet frame from outside of FE
  - Expect ethernet frame
  - Produce ethernet frame for followed Decapsulator
  - Possible Metadata: Produce InputPortID
  - Possible property: PortName, MTU, PromiscuousMode etc.
  - Possible events?

L2 Decapsulation

may categorize into various types according to different layer 2 protocols, e.g.,

- EtherDecap

◆ Function: perform frame validation and filtering, and remove ethernet frame headers

◆ Expect ethernet frame

◆ Produce IP packets for IPValidator, Redirector, or Dropper

◆ Metadata: Produce ErrorID (if possible)

◆ Possible property: DispatchTable used for selecting output for the packet stream

◆ Possible events?

IP Validator

- Function: validates the IP header
- Expect IP packet
- Produce IP packets for IPUcastLPM, Redirector, Dropper, or others
- Metadata: Produce ErrorID (if possible)
- more property?
- Events?

Dropper

- ◆ Function: process packets which will be dropped
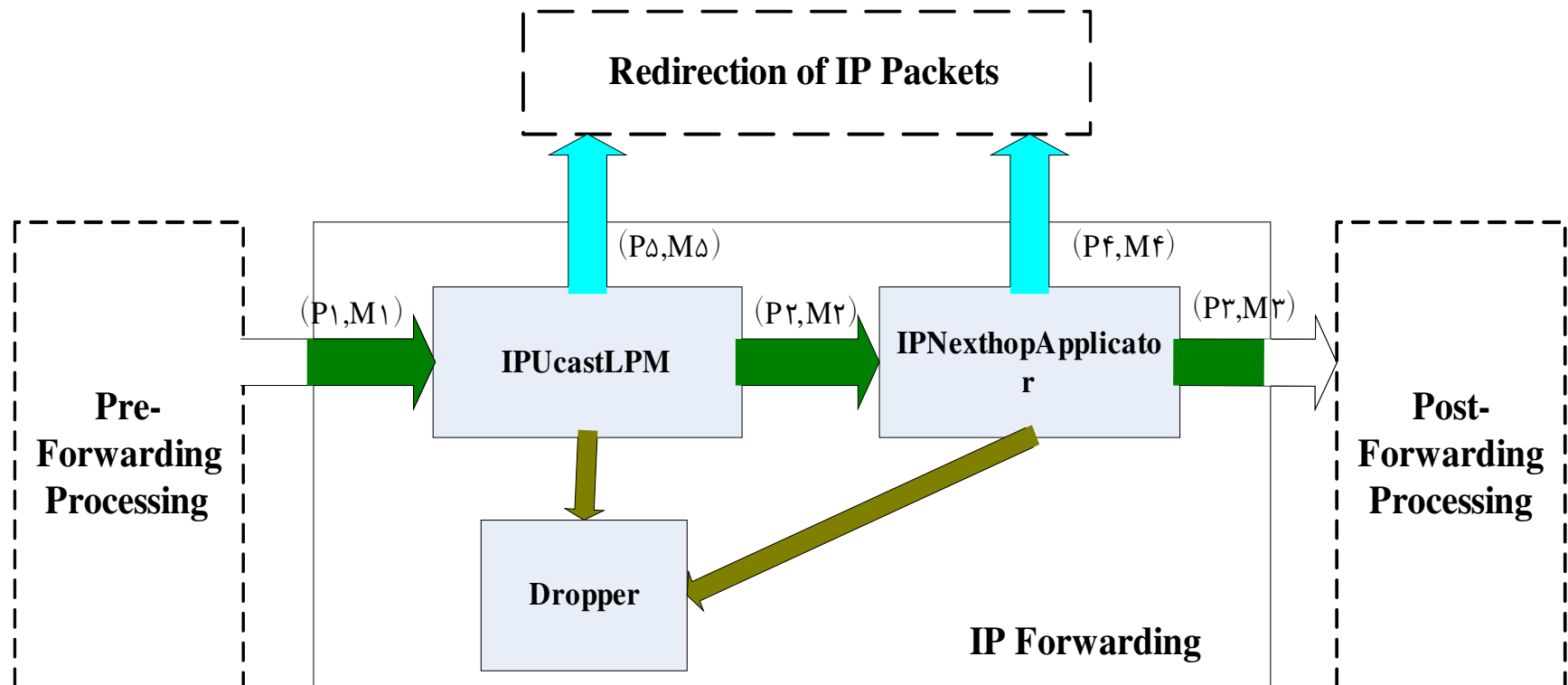 - ○

- ◆ any property, events?

IP Forwarding Stage (1)

Basic functions:

1. IP Unicast Longest Prefix Matching
   - IPv4, IPv6, …
2. IP Next-hop Applicator
3. IP Multicast
4. Dropping

Question: should some L2-3 forwarding like MPLS also be included?

IP Forwarding Stage (2)

e.g., IP unicast forwarding model

IP Unicast LPM

- Function:Longest Prefix Match lookup for IP packets
- Expect IP packet
- Produce IP packets for IP Nexthop Applicator, Redirector, or Dropper
- Meta: Produce NextHopID, InputPortID, or ErrorID, respectively
- Possible property:PrefixTable, LocalIPAddrTable etc.
- Events?

IP Nexthop Applicator

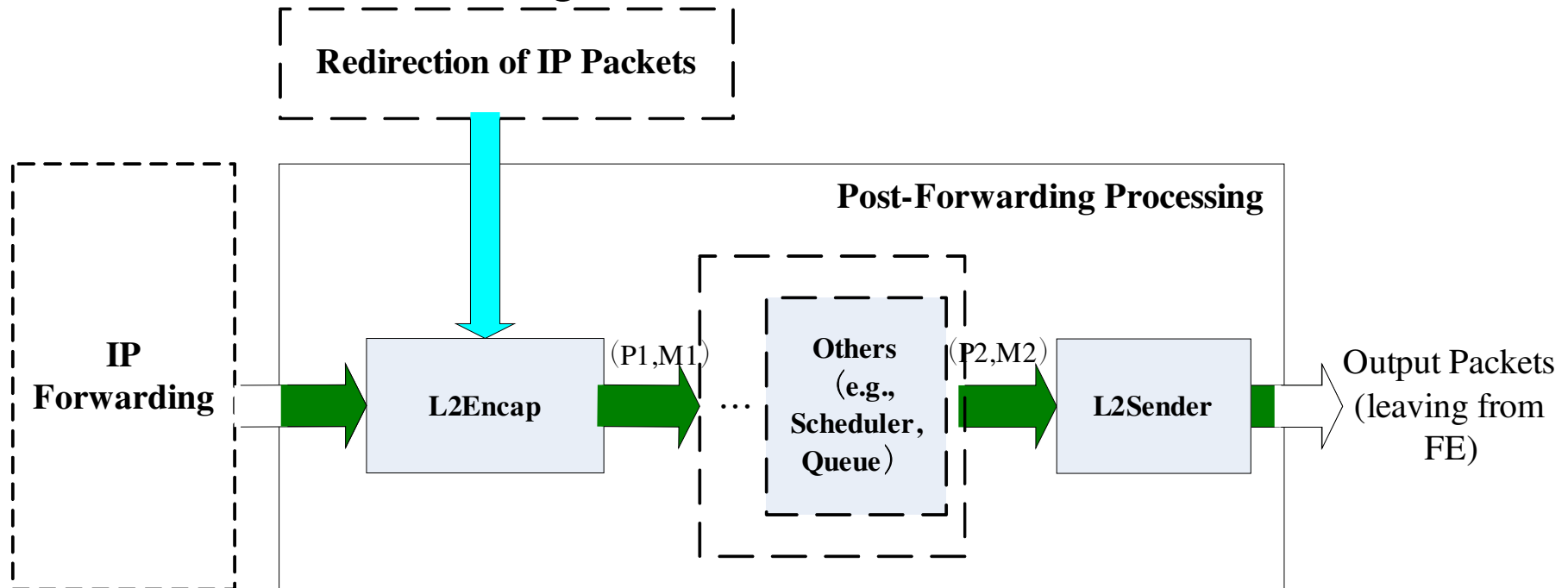Function: applicating next hop action to IP packets

◆ Expect IP packet and NextHopID

◆ Produce IP packets for post-forwarding stage, Redirector, etc

◆ Metadata: Produce L2Index, InputPortID, or ErrorID, …

◆ Possible property: NextHopTable etc.

◆ Events?

Post-Forwarding Processing Stage

Basic functions:
1. Layer 2 Encapsulation
2. Layer 2 Sender
3. Queue Processing?

Layer 2 Encapulation Example: Ethernet Encap

- Function: ethernet encapsulation
- Expect IP packet and L2Index
- Produce IP packets for EtherSender or others
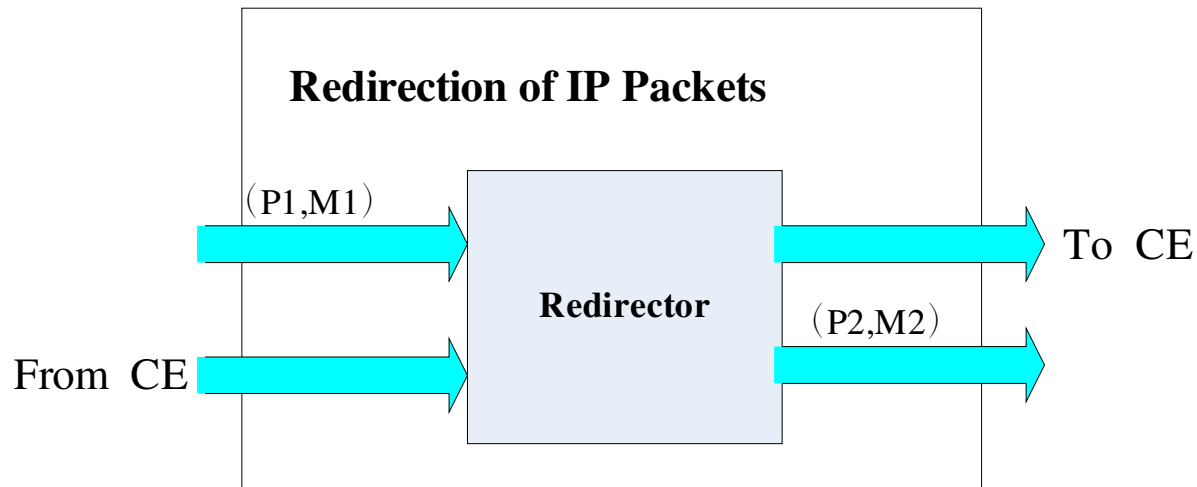- Possible property: L2Table etc
- Events?

Layer 2 Sender Example: Ethernet Sender

- Function:send ethernet frame to outside of FE
- Expect ethernet frame and OutputPortID
- Produce ethernet frame
- Possbile property similar to EtherReceiver
- Events?

IP Processing Stage – Redirection

Basic function: Redirect IP packet to CE and receive IP packet from CE

Redirector

- Function: exchanging data packets between the FE and the CE

- Expect IP packets from CE or FE

- Metadata: Expect InputPortID

- Produce IP packets to CE or FE (EtherEncap or IPValidator)

- Metadata: Produce OutputPortID

- More? Events?