On Update of ForCES LFB Library Draft

<draft-ietf-forces-lfb-lib-01>

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Draft Status

• Version 01: March 2010

• Update Version to be made soon
  – based on discussions and consensuses since last version
  – include the following modifications
    • modifications on definitions of LFB classes
      – especially on the Port related LFBs
    • to rich the overview section to reflect the ideas on the modifications of
      LFB classes and their functions
      – e.g., add descriptions on support of VLANs, why, which way, to
        which extend ...
    • compose xml files for various LFBs
    • recompose possible use cases
Consensuses since Version 01 (1)

• Remove all related to FEPO and FEO
• Remove all related to ICMP processing
• IPv4 and IPv6 are separate at the level of LFBs
  – e.g., IPv4Validator, IPv6Validator
    ARP LFB, IPv6ND LFB
• On LFB Classes
  – to define a sample scheduler LFB with multiple inputs and one output, and with queues inside
    • an xml definition is given for comment
  – Redirect LFBs: RedirectSink LFB and RedirectTap LFB
• Much work done and great progress made on the definitions of Ethernet connection related LFBs
  – As Joel presented
Consensuses since Version 01 (3)

• Use ArpTable in ARP LIB and NbrTable in IPv6ND LFB as alias in EtherEncap

• NH is reasonable to have as a separate table. So you have LPM --> NH. However, the fact that there is another "model" which has a FIB conjoined with NH needs to be mentioned in the draft. In such a model - the FE will not have a separate NH table/LFB. We need to mention that in such a case, the FE needs to do book-keeping to keep track of what it means to have example path nh.1.2 and translate that to the conjoined FIB/NH.
For Discussion: LFB Classes

- **Ethernet connectivity LFBs**
  - EtherPHY LFB, EtherInPort LFB, EtherClassifier LFB, EtherEncap LFB, EtherOutLFB

- **IPv4 Processing LFBs**
  - IPv4Validator LFB, IPv4UcastLPM LFB, IPv4NHApplicator LFB

- **IPv6 Processing LFBs**
  - IPv6Validator LFB, IPv6UcastLPM LFB, IPv6NHApplicator LFB

- **Address Resolution LFBs**
  - ARP LFB, IPv6ND LFB

- **QoS LFBs**
  - Generic Scheduler LFB

- **Redirect LFBs**
  - RedirectTap LFB and RedirectSink LFB
For Discussion: EtherPHY LFB (1)

- Inputs
  - one single input receiving Ethernet packets from EtherOutPort LFB

- Outputs
  - one single output sending Ethernet packets to EtherInPort LFB

- Events
  - ?

- Capabilities
  - ?
### For Discussion: EtherPHY LFB (2)

<table>
<thead>
<tr>
<th>Component Name</th>
<th>type</th>
<th>property</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>IfIndex</td>
<td>uint32</td>
<td>read-write</td>
<td>Alias (EtherInPort)</td>
</tr>
<tr>
<td>IfName</td>
<td>String[16]</td>
<td>read-write</td>
<td>Alias (EtherInPort)</td>
</tr>
<tr>
<td>LinkSpeed</td>
<td>Atomic: LANSpeedType</td>
<td>read-write</td>
<td>Alias (EtherInPort)</td>
</tr>
<tr>
<td>DuplexMode</td>
<td>Atomic: NegotiationType</td>
<td>read-write</td>
<td>Alias (EtherInPort)</td>
</tr>
<tr>
<td>Media</td>
<td>uchar</td>
<td>read-only</td>
<td>“Copper100Base-TX”</td>
</tr>
<tr>
<td>StatsEnable</td>
<td>booleanType</td>
<td>read-write</td>
<td>&quot;no&quot;</td>
</tr>
<tr>
<td>PortStats</td>
<td>Struct: PortStatsType</td>
<td>read-reset</td>
<td></td>
</tr>
</tbody>
</table>

- do we need other components alias from EtherInPort?  
  - like the port status?
For Discussion: EtherInPort LFB (1)

• **Inputs**
  – one single input receiving Ethernet packets from one EtherPHY LFB

• **Outputs**
  – L3forwardingOut: single output sending Ethernet packets to EtherClassifier LFB for L3 processing
  – L2forwardingOut: single output sending packets to LFBs on bridging functions for L2 only processing

• **Events**
  – PortStatusChanged

• **Capabilities**
  – none

• **Components**
  – see next page
<table>
<thead>
<tr>
<th>Component Name</th>
<th>Type</th>
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</tr>
</thead>
<tbody>
<tr>
<td>IfIndex</td>
<td>uint32</td>
<td>read-only or r/w?</td>
<td>-</td>
</tr>
<tr>
<td>IfName</td>
<td>String[16]</td>
<td>read-write</td>
<td>-</td>
</tr>
<tr>
<td>LinkSpeed</td>
<td>Atomic: LANSpeedType</td>
<td>read-write</td>
<td>-</td>
</tr>
<tr>
<td>MTU</td>
<td>uint32</td>
<td>read-write</td>
<td>-</td>
</tr>
<tr>
<td>OperaStatus</td>
<td>Atomic: PortStatusValues</td>
<td>read-only</td>
<td>&quot;down&quot;</td>
</tr>
<tr>
<td>AdminStatus</td>
<td>Atomic: PortStatusValues</td>
<td>read-write</td>
<td>&quot;down&quot;</td>
</tr>
<tr>
<td>PromiscuousMode</td>
<td>booleanType</td>
<td>read-write</td>
<td>&quot;no&quot;</td>
</tr>
<tr>
<td>CarrierStatus  (need it?)</td>
<td>booleanType</td>
<td>read-only</td>
<td>&quot;no&quot;</td>
</tr>
<tr>
<td>DuplexMode</td>
<td>Atomic: NegotiationType</td>
<td>read-write</td>
<td>&quot;auto&quot;</td>
</tr>
<tr>
<td>SrcMACAddr</td>
<td>IEEEMAC</td>
<td>read-write</td>
<td>-</td>
</tr>
<tr>
<td>MacAliasTable</td>
<td>Array: IEEEMAC</td>
<td>read-write</td>
<td>-</td>
</tr>
<tr>
<td>L2ForwardingEnable</td>
<td>booleanType</td>
<td>read-only</td>
<td>&quot;no&quot;</td>
</tr>
<tr>
<td>StatsEnable (statistics enable)</td>
<td>booleanType</td>
<td>read-write</td>
<td>&quot;no&quot;</td>
</tr>
<tr>
<td>PortStats (port statistics)</td>
<td>Struct: PortStatsType</td>
<td>read-reset</td>
<td>-</td>
</tr>
</tbody>
</table>
For Discussion: EtherOutPort LFB (1)

• Inputs
  – one single input receiving Ethernet packets from EtherEncap LFB and/or other bridging LFBs

• Outputs
  – one single output sending Ethernet packets to one EtherPHY LFB

• Events
  – none? or Portstatschanged?

• Capbilities
  – none?
For Discussion: EtherOutPort LFB (2)

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<td>&quot;no&quot;</td>
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<td>PortStats (port statistics)</td>
<td>Struct: PortStatsType</td>
<td>read-reset</td>
<td></td>
</tr>
</tbody>
</table>

- do we need other components with alias from EtherInPort?  
  - like MAC address, port status?
For Discussion: EtherClassifier LFB (1)

• Inputs
  – one single inputs receiving Ethernet packets from EtherInPort

• Outputs
  – multiple singleton outputs (or one group output?) sending various types of over Ethernet layer packets

• Events
  – none?

• Capabilities
  – none?
For Discussion: EtherClassifier LFB (2)

- Components

<table>
<thead>
<tr>
<th>Component Name</th>
<th>type</th>
<th>property</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>DispatchTable</td>
<td>Array: DispatchTableType</td>
<td>read-write</td>
<td></td>
</tr>
<tr>
<td>VLanTable</td>
<td>Array: VLanTableType</td>
<td>read-write</td>
<td></td>
</tr>
</tbody>
</table>

DispatchTableType{
    PacketType:
    1 - Other
    2 – IPv4
    3 – IPv6
    4 – ARP
    5 – ND
    6 – MPLSUnicast
    7 – MPLSMulticast
    8 – PPPDiscovery
    9 - PPPSession

index }

VLanTableType: To be done
For Discussions: EtherEncap LFB (1)

• Inputs
  – one single input receiving packets from multiple upstream LFBs

• Outputs
  – SuccessOut?: single output
  – ExceptionOut?: single output

• Events
  – none

• Capbilities
  – none
For Discussion: EtherEncap LFB (2)

- Components

<table>
<thead>
<tr>
<th>Component Name</th>
<th>type</th>
<th>property</th>
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</tr>
</thead>
<tbody>
<tr>
<td>ArpTable</td>
<td>Array: ArpTableEntryType</td>
<td>read-write</td>
<td></td>
</tr>
<tr>
<td>DCHostTablev4</td>
<td>Array: DCHostTableEntryTyp ev4</td>
<td>read-write</td>
<td></td>
</tr>
<tr>
<td>VLanTable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NbrTable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DCHostTablev6</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
For Discussion: IPv4Validator LFB (1)

• Inputs
  – one single input receiving IPv4 packets from multiple upstream EtherClassifier or other LFBs

• Outputs
  – IPv4UnicastOut, one single output
  – IPv4MulticastOut, one single output
  – FailOutput, one single output

• Events
  – none?

• Capbilities
  – none?
For Discussion: IPv4Validator LFB (2)

- Components

<table>
<thead>
<tr>
<th>Component Name</th>
<th>type</th>
<th>property</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LocalIPv4addressTable</td>
<td>Array: Portv4AddressType</td>
<td></td>
<td></td>
</tr>
<tr>
<td>StatsEnable</td>
<td>booleanType</td>
<td>read-write</td>
<td>“no”</td>
</tr>
<tr>
<td>IPv4ValidatorStats</td>
<td>Struct: IPv4ValidatorStatisticsType</td>
<td>read-set</td>
<td></td>
</tr>
</tbody>
</table>
For Discussion: IPv4Validator LFB (3)

- portv4AddressType {
   IfIndex      //how to be represented so as to be alias of IfIndex in EtherInPort, and may should be read only?/
   IPv4Address
   IPv4NetMask
}

- IPv4ValidatorStatisticsType {
   badHeaderPkts
   badTotalLengthPkts
   badTTLPkts
   badChecksum
}
For Discussion: IPv4UcastLPM LFB

- TBD
For Discussion: ARP LFB (1)

- **Inputs**
  - ArpPktIn, ARP protocol packet in from EtherClassifier LFB

- **Outputs**
  - ArpPktOut, ARP protocol packet out to EtherEncap LFB

- **Events**
  - none?

- **Capabilities**
  - none?
For Discussion: ARP LFB (2)

• Components

<table>
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<th>Component Name</th>
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<tr>
<td>LocalIPv4addressTable</td>
<td>Alias</td>
<td>IPv4Validor LFB</td>
<td></td>
</tr>
<tr>
<td>Arptable</td>
<td>Alias</td>
<td>EtherEncap LFB</td>
<td></td>
</tr>
</tbody>
</table>

• many problems regarding how the alias components are represented?
  – especially the local IP address component
Comments on LFB class definitions work

• might be the key work in next step

• quite complex work to do
  – need more people to join the discussions so as to speed up
    • Shall we extend the discussions from among authors to the whole ForCES list ?

• should accomplish the work ASAP!
Acknowledgments

Thanks to Chuanhuang Li, Rong Jin and David Allan for their valuable contributions to the progress of the work.
Thanks!