ForCES OpenFlow Model Library

IETF – 84 Vancouver

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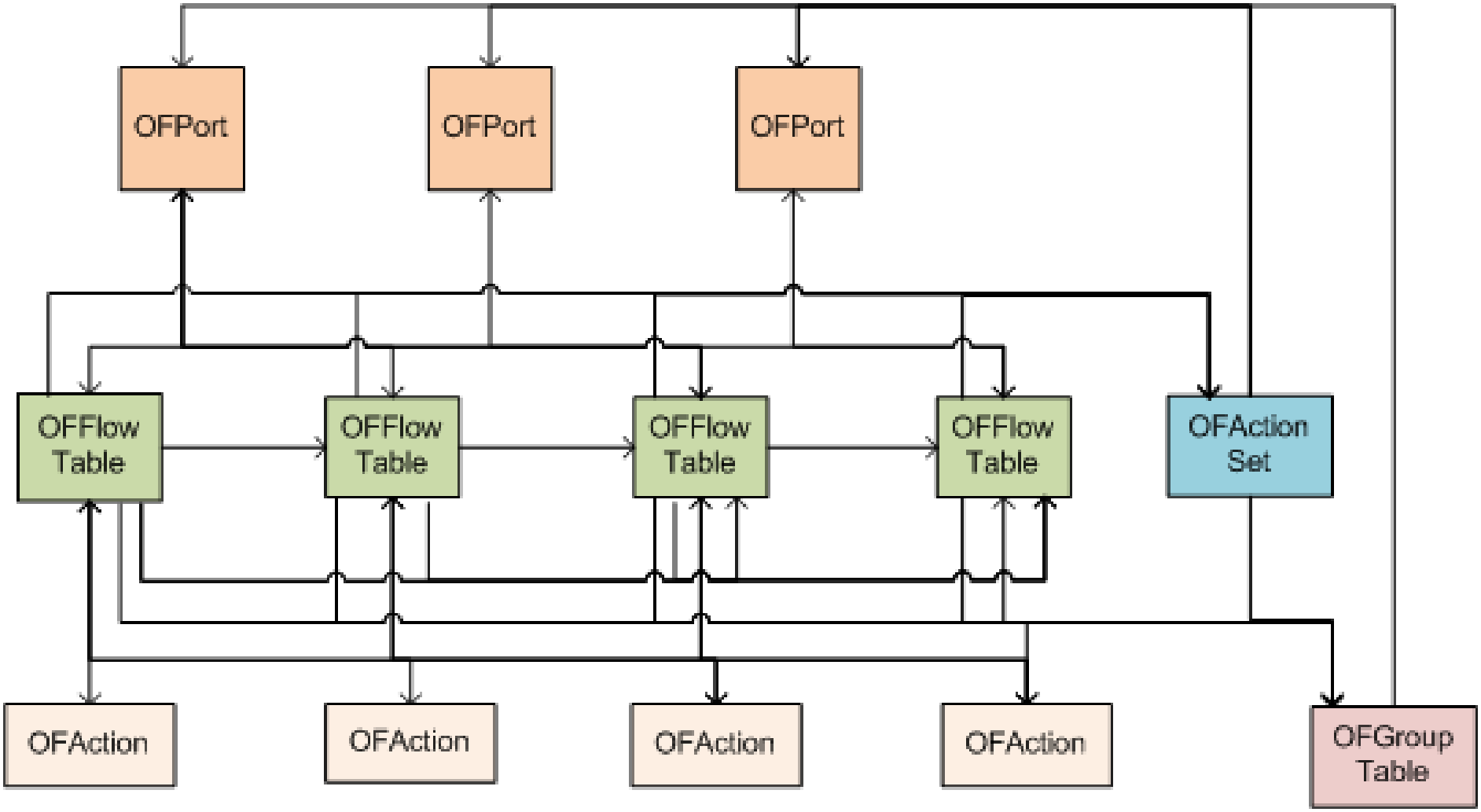
Motivation

- Demonstrate the ability to describe OpenFlow via ForCES model.
  - Create an implementatable OpenFlow switch using ForCES architecture
- Facilitate building applications to create either:
  - OpenFlow-enabled ForCES base switch.
  - ForCES-enabled OpenFlow switch.

Current status

- First draft submitted May 25.
- Lots of comments and suggestions.
- Second draft submitted July 9th.
  - Many fixes and updates.

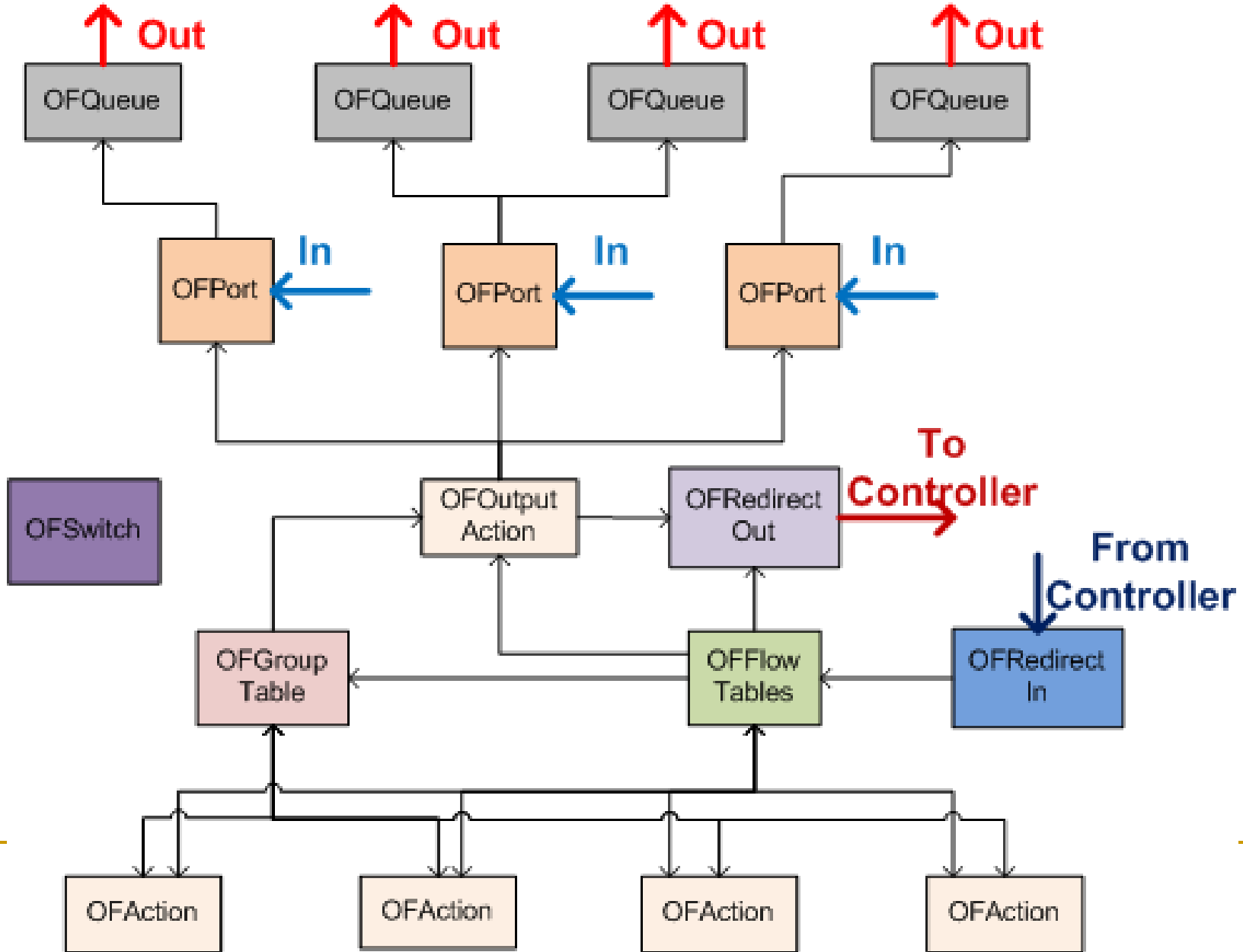
Model draft version 00



Problems with version-00

- Misconceptions from reading the OF specs.
- Queues not correctly placed.
- Model too meshy.
- ActionSet LFB empty.

Model draft version 01



Changes from version-00

- One OFFlowTables LFB for all Flow Tables within a switch
  - Makes the graph much more simpler.
  - Metadata & ActionSet Metadata's are now invisible to the model (internal to OFFLowTables).
- ActionSet LFB removed.
  - Original Action Set LFB was empty of components – required data resides in metadata accompanying a packet.

Changes from version-00

- Buffering packets is considered implementation specific and is logically done in the OFFlowTables.
- Added OFRedirectIn & OFRedirectOut.
  - Should these be merged into one? (one point To/From controller)
  - Buffering will be considered to be done in.
- Correctly positioned the OFQueue LFBs and added them to the figure.

Changes from version-00

- Introduced PacketID.
  - Identifier used, by OFFlowTable & OFGroupTable LFBs, to continue processing the packet from where it left (upon returning from an Action LFB).
  - PacketID is opaque to the ActionLFBs and not used by them.
  - PacketID or something similar is necessary, but is it necessary to be modeled, or is it implementation specific?

OFSwitchLFB

Components

DatapathID
MissSendLen
HandleFragments
ReassembleFragments
InvalidTTLtoController
SwitchDescription
Ports (Array of {uint32})

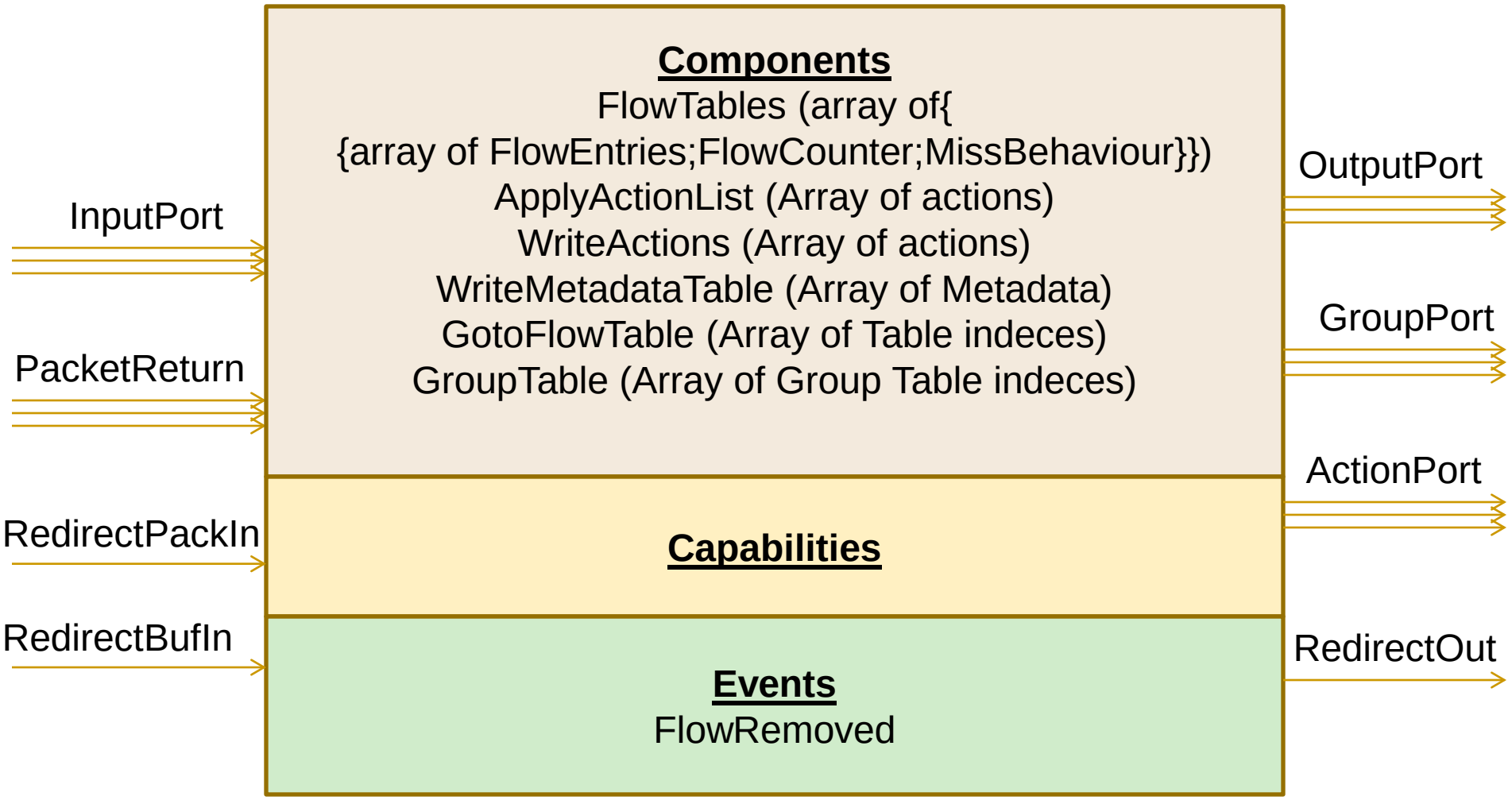
Capabilities

FlowStatistics
TableStatistics
PortStatistics
GroupStatistics
IPReassembly
QueueStats
ARPMatchIP
ActionsSupported
MaxBufferedPackets
TablesSupported

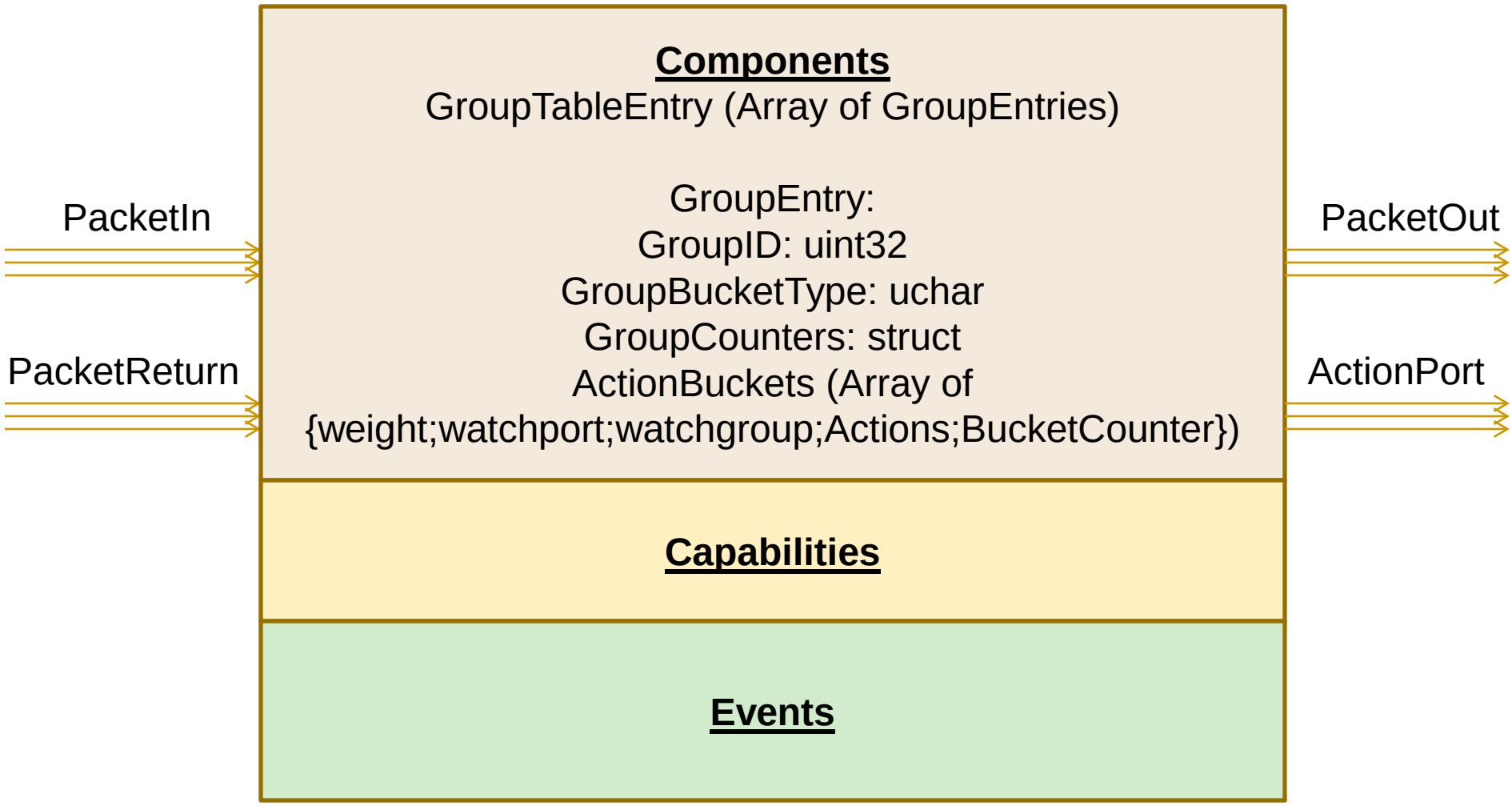
Events

PortAdded
PortDeleted
PortModified

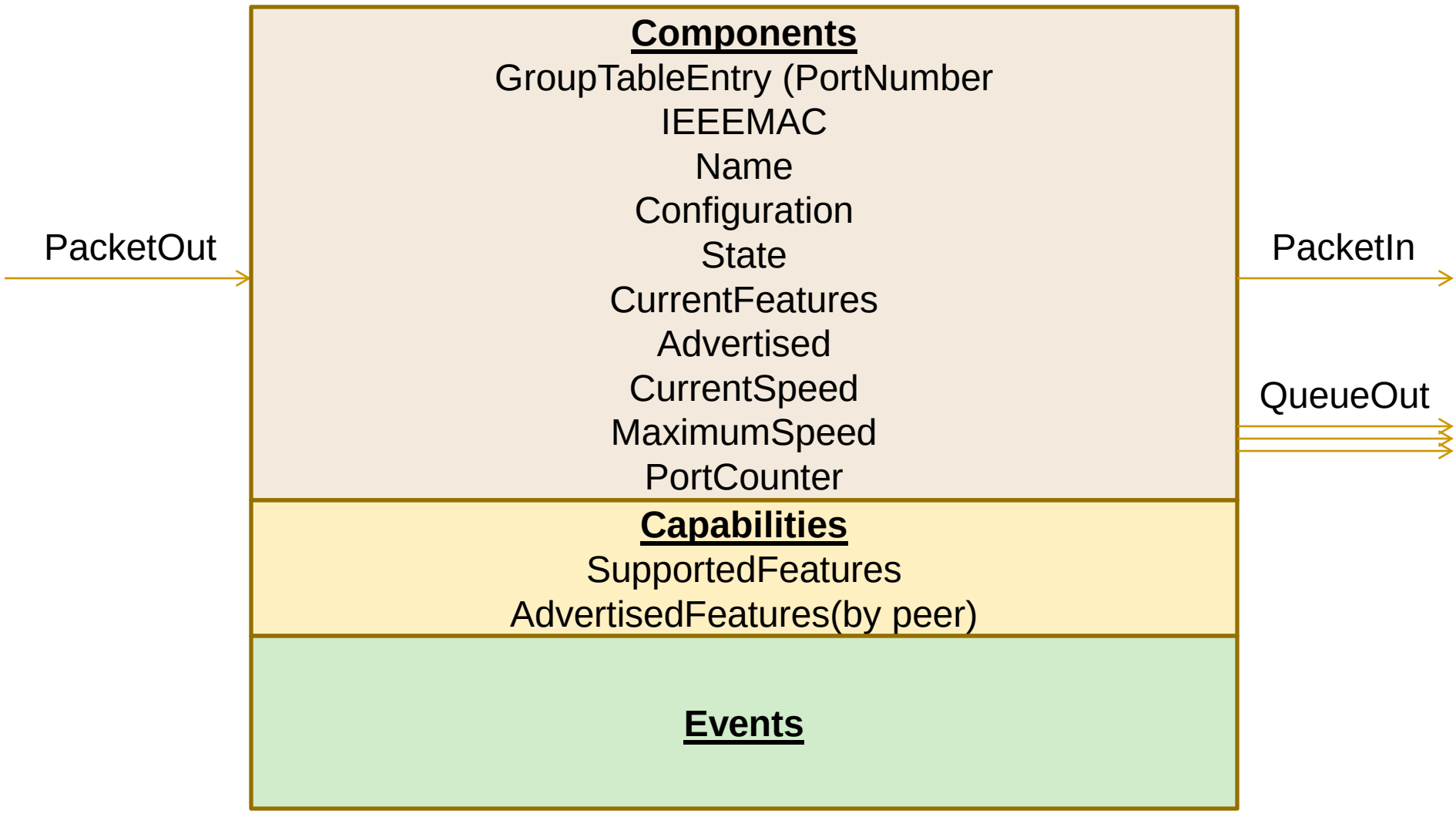
OFFlowTables LFB



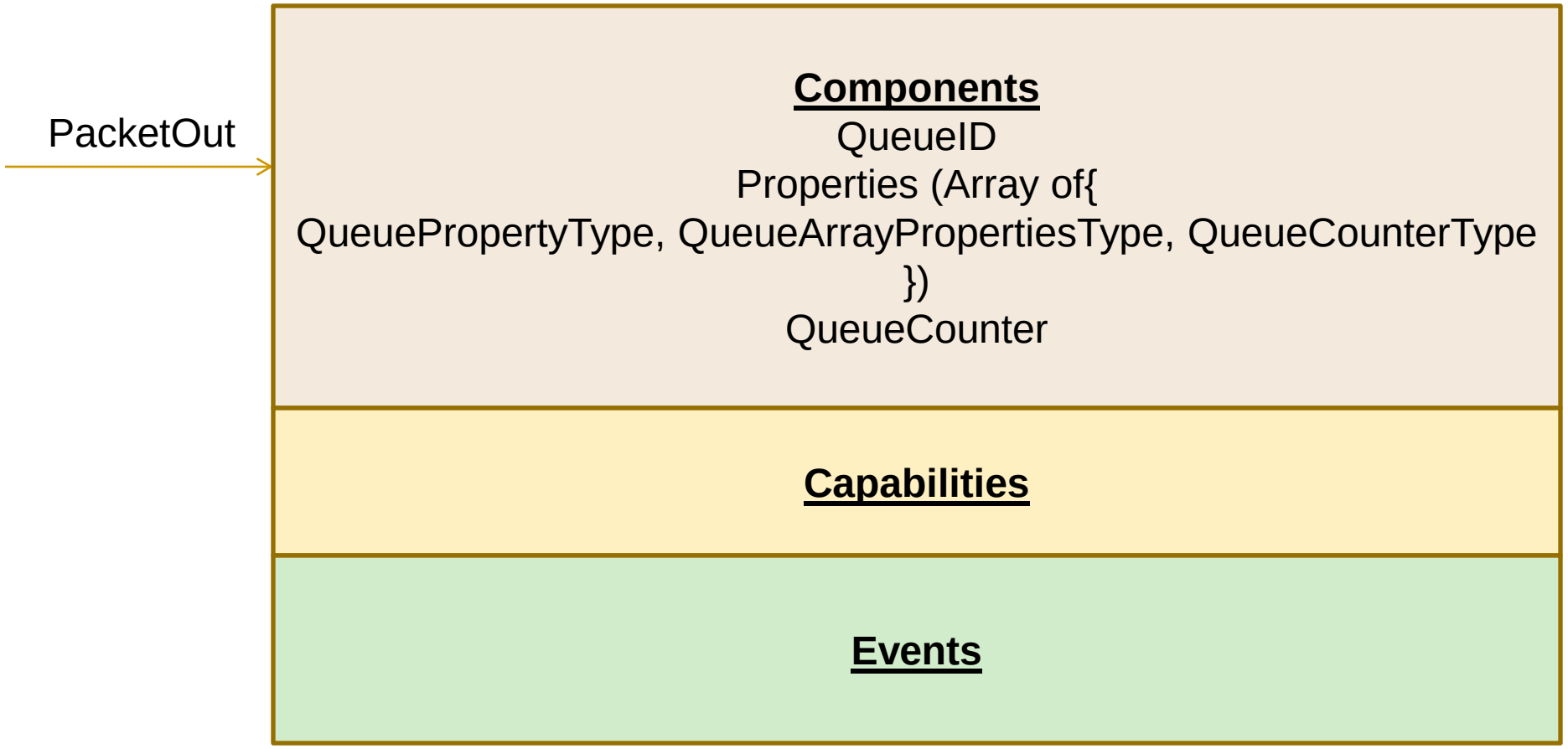
GroupTable LFB



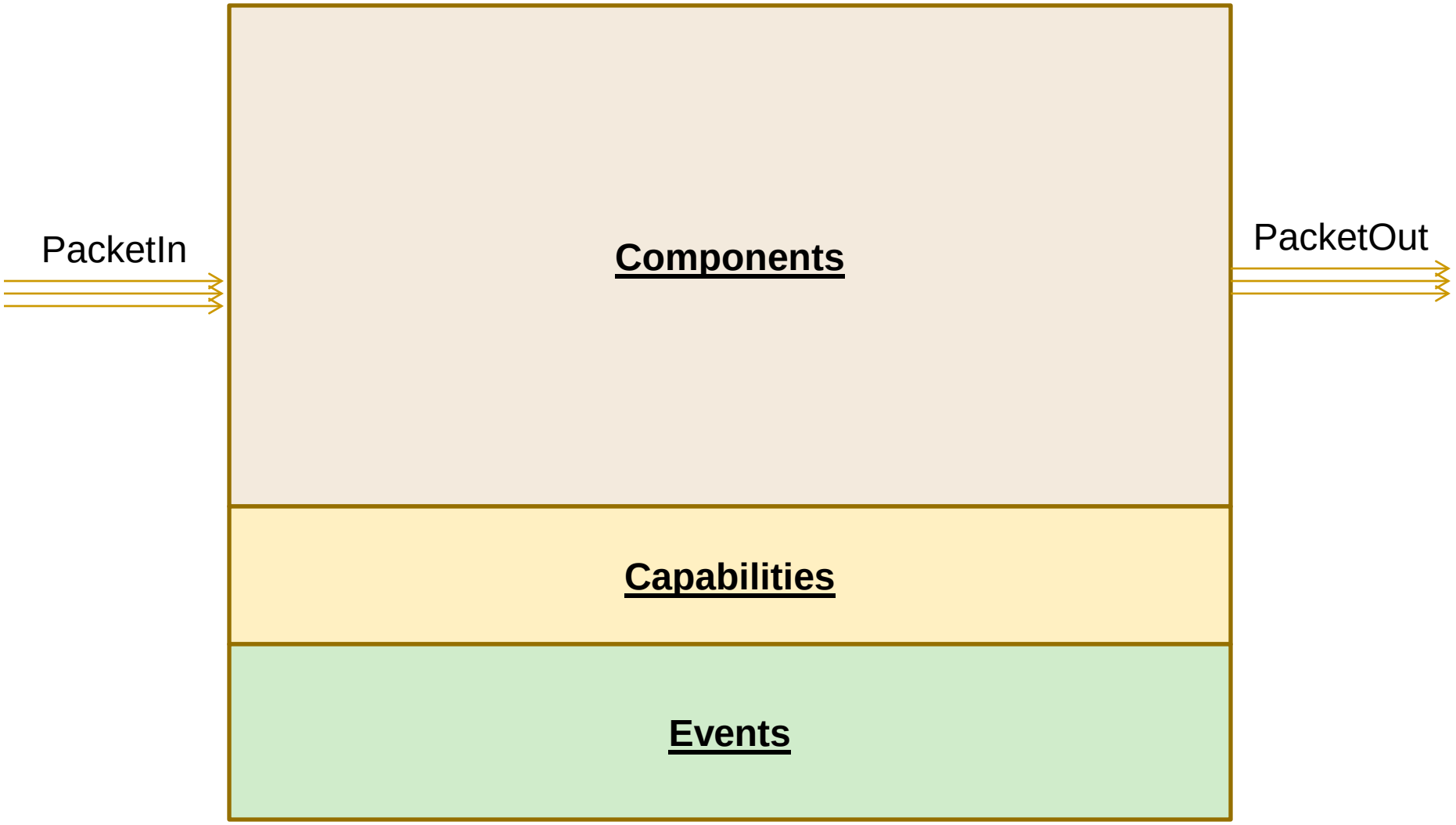
Port LFB


Components
GroupTableEntry (PortNumber
IEEEMAC
Name
Configuration
State
CurrentFeatures
Advertised
CurrentSpeed
MaximumSpeed
PortCounter
Capabilities
SupportedFeatures
AdvertisedFeatures(by peer)
Events
PacketOut
PacketIn
QueueOut

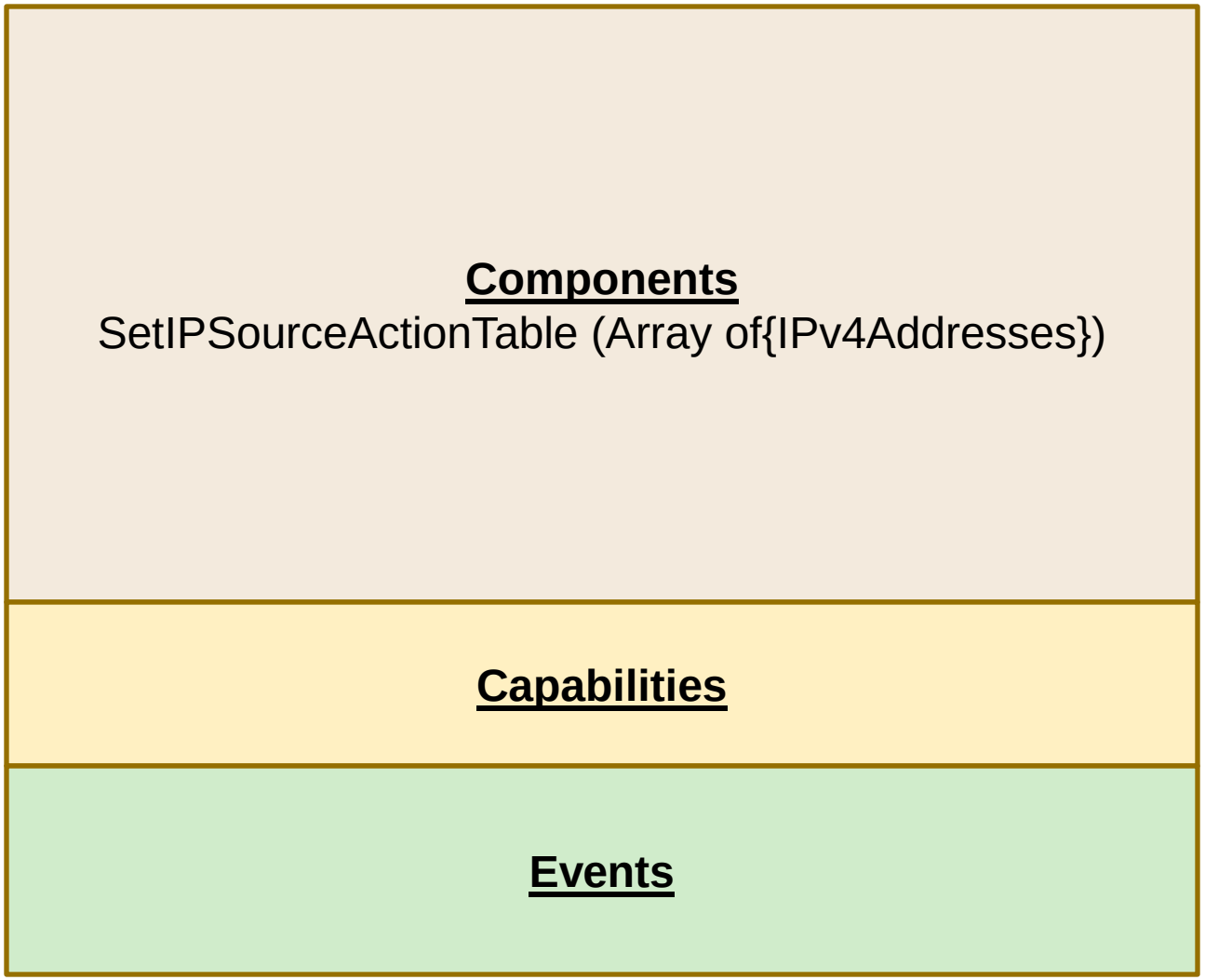
Queue LFB


PacketOut
Components
QueueID
Properties (Array of{
QueuePropertyType, QueueArrayPropertiesType, QueueCounterType
})
QueueCounter
Capabilities
Events

OFAction LFB



e.g. OFActionSetIPSource



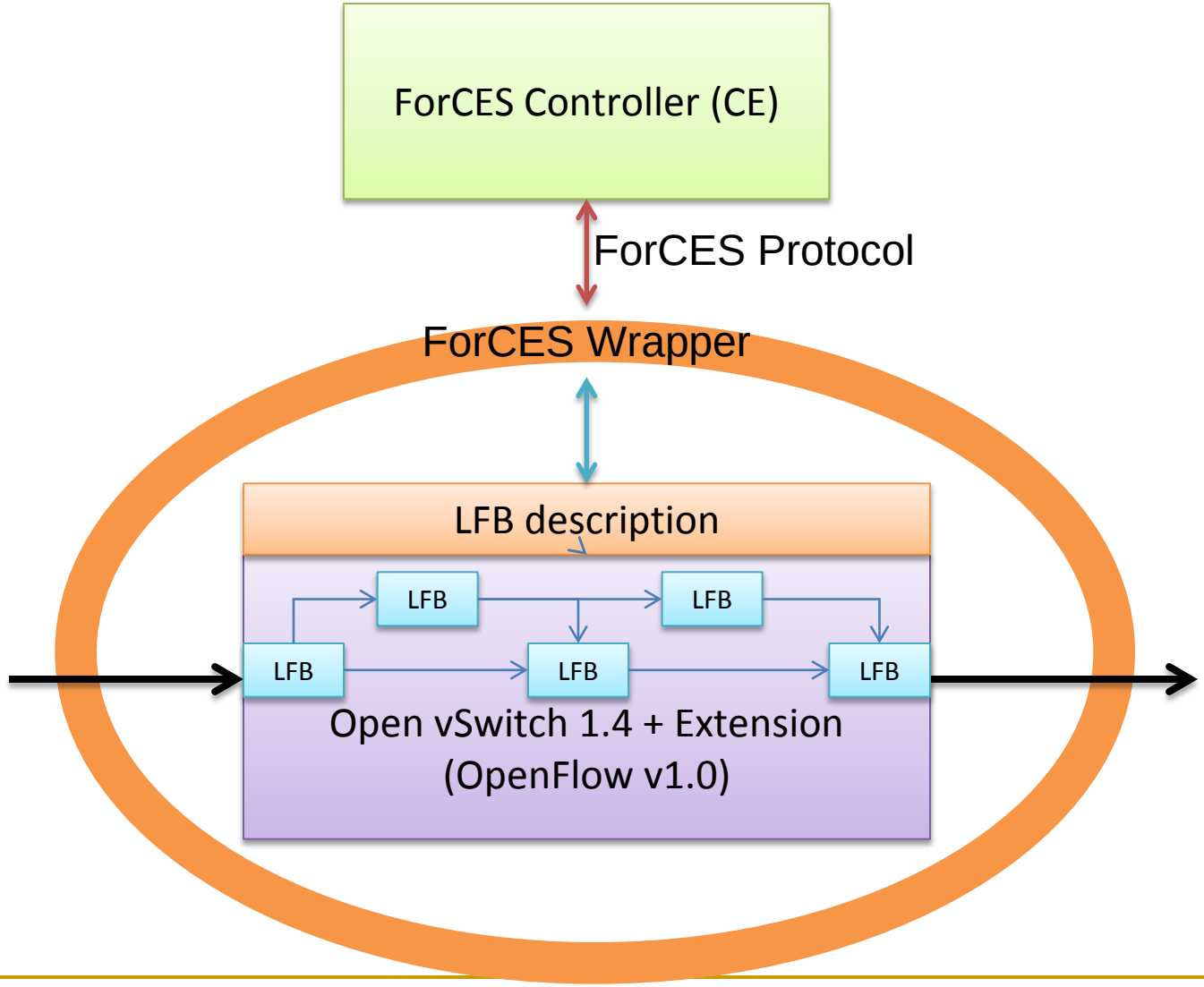
Action LFBs

OFActionOutput	*OFActionCopyTTLIn*
OFActionSetVLANVID	OFActionSetMPLSLabel
OFActionSetVLANPriority	OFActionSetMPLSTC
OFActionSetMACSource	OFActionSetMPLSTTL
OFActionSetMACDestination	*OFActionDecrementMPLSTTL*
OFActionSetIPSource	OFActionPushVLan
OFActionSetIPDestination	*OFActionPopVLAN*
OFActionSetIPTOS	OFActionPushMPLS
OFActionSetIPECN	OFActionPopMPLS
OFActionSetTCPSource	**OFActionSetQueue**
OFActionSetTCPDestination	OFActionSetIPTTL
OFActionCopyTTLOut	*OFActionDecrementIPTTL*

Future Plans

- Finalize the XML by next draft after comments and answered questions.
- Add OpenFlow 1.0, 1.2 and 1.3 libraries.

Backup Slide #1



Backup Slide #2