ForCES-based BNG

draft-haleplidis-forces-bng-00

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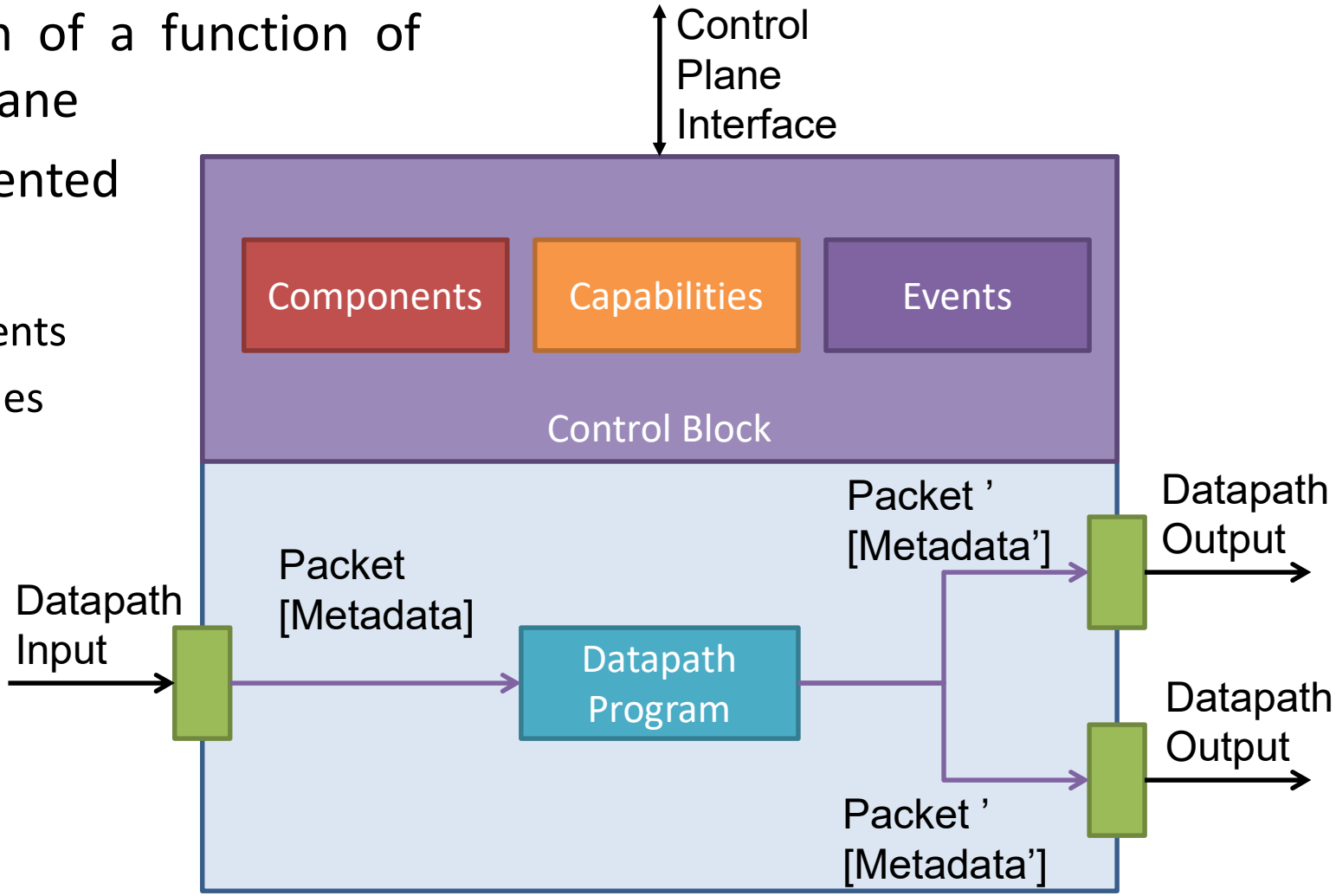
ForCES Quick Intro

- Forwarding and Control Element Separation (FEs & CEs)
- Defines
  - Data/Information model (RFC5812, RFC7408)
  - Protocol (RFC5810, RFC7121, RFC7391)
  - Transport Layer (TML) (RFC5811)
- Two interoperability tests (RFC6053, RFC 6984)
- Features
  - High Availability
  - Publish/Subscribe & Request/Response
  - Transport Layer Agnostic
  - Extensible data model
  - Model independent protocol

Intro to ForCES LFB class

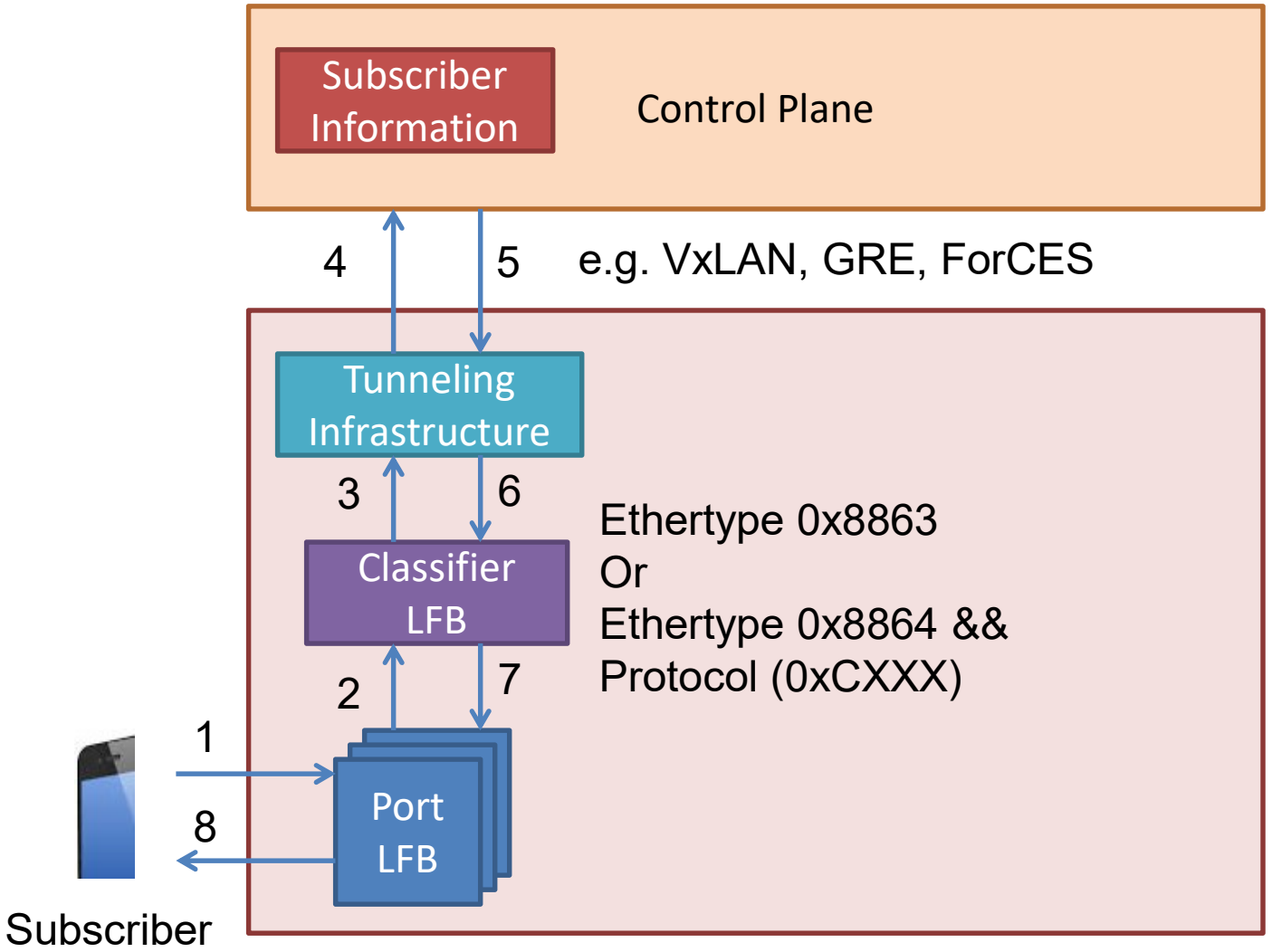
- Abstraction of a function of the data plane
- Object-Oriented
- Defines:
  - Components
  - Capabilities
  - Events



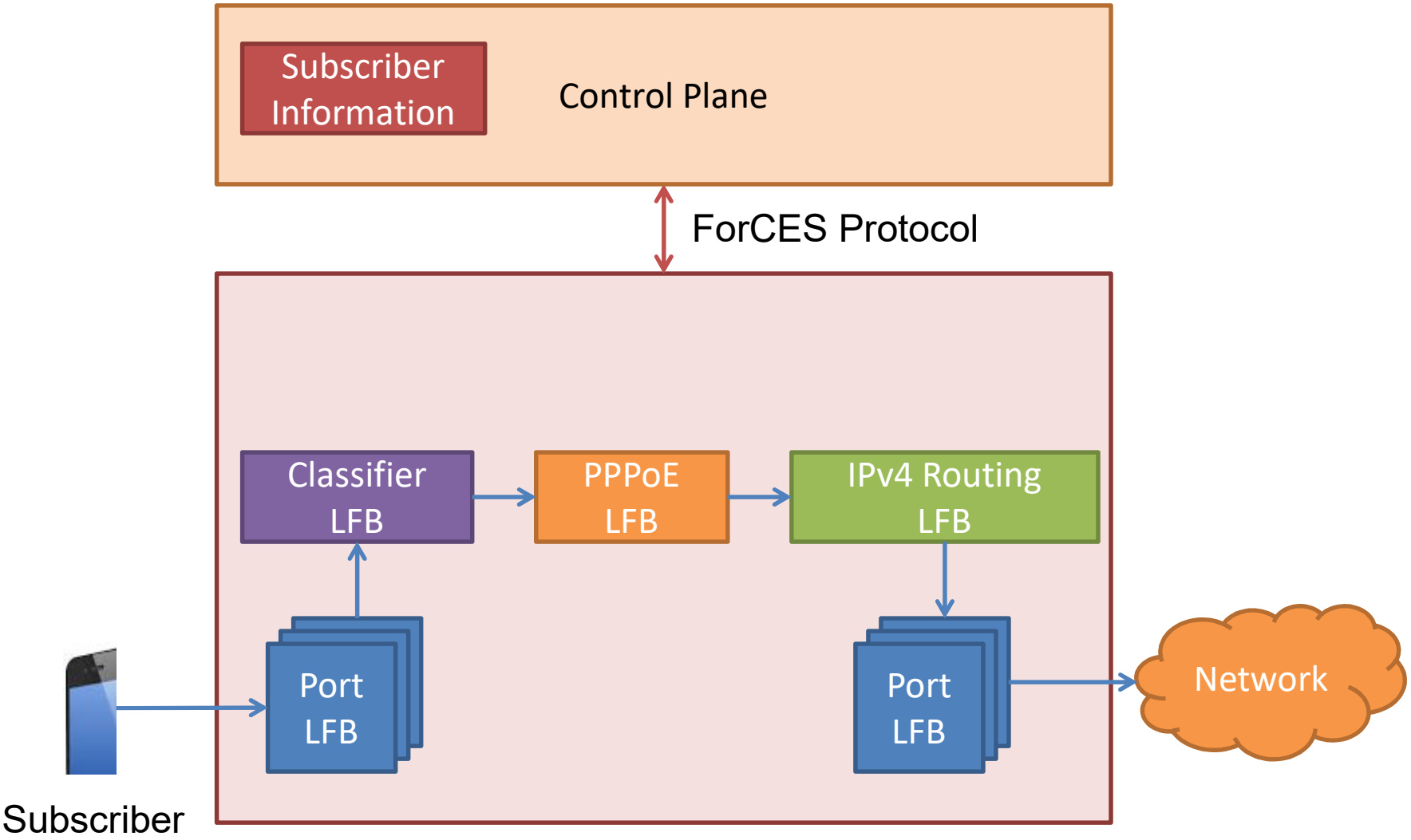
Why ForCES

- Existing IETF protocol
- Provides data model describing state, capabilities and events
- Create new packet services
  - Dynamic LFB graphs
- Native support for any type of access
  - Fixed
  - Mobile
- Model agnostic protocol
  - **No change on the protocol on any new LFB definition**

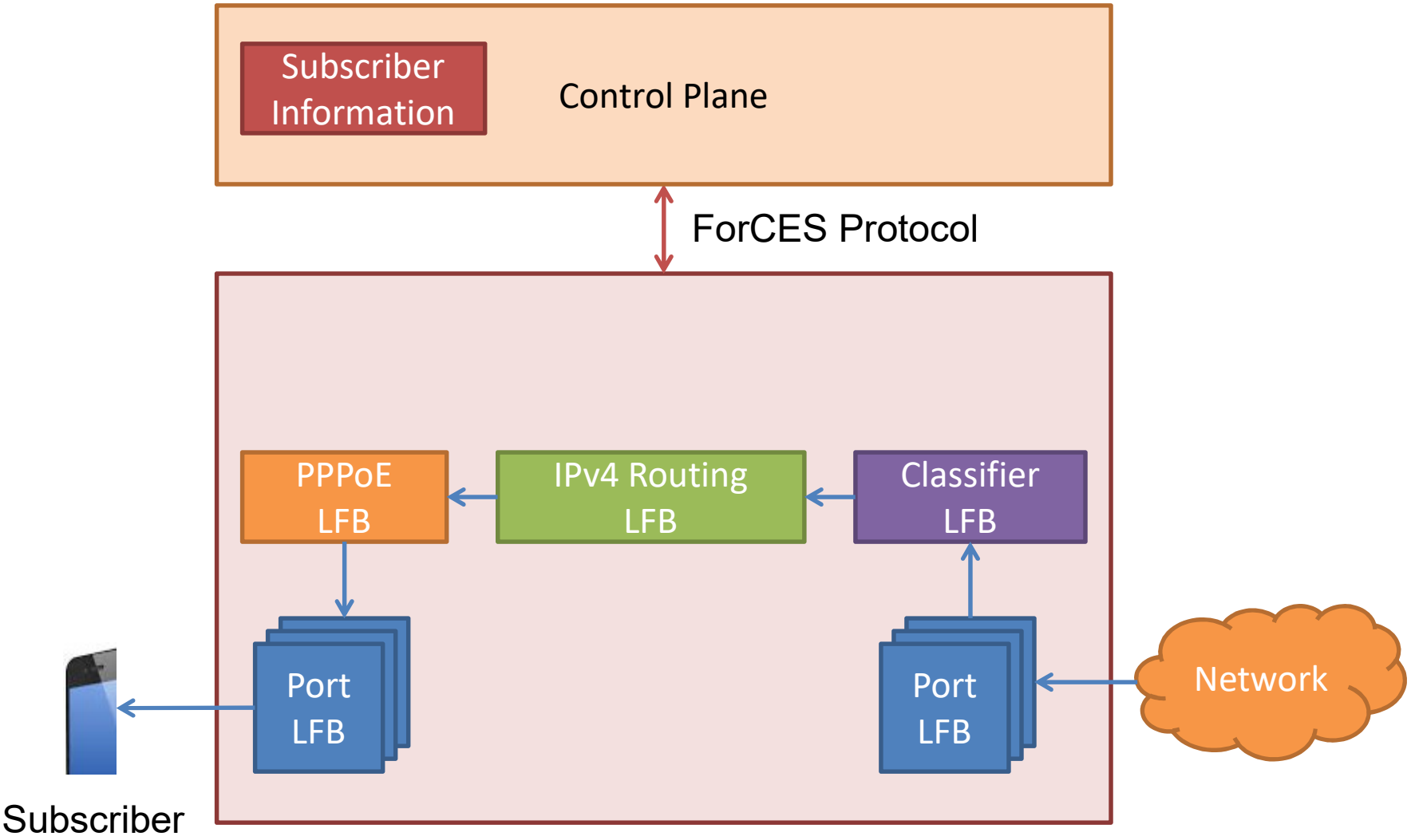
BNG Control Traffic Handling



BNG Basic Connectivity Service (Upstream)



BNG Basic Connectivity Service (Downstream)



Traffic Monitoring

- Multiple approaches
  - Control Plane Poll LFB (PPPoE)
  - Subscriber to notifications for statistics

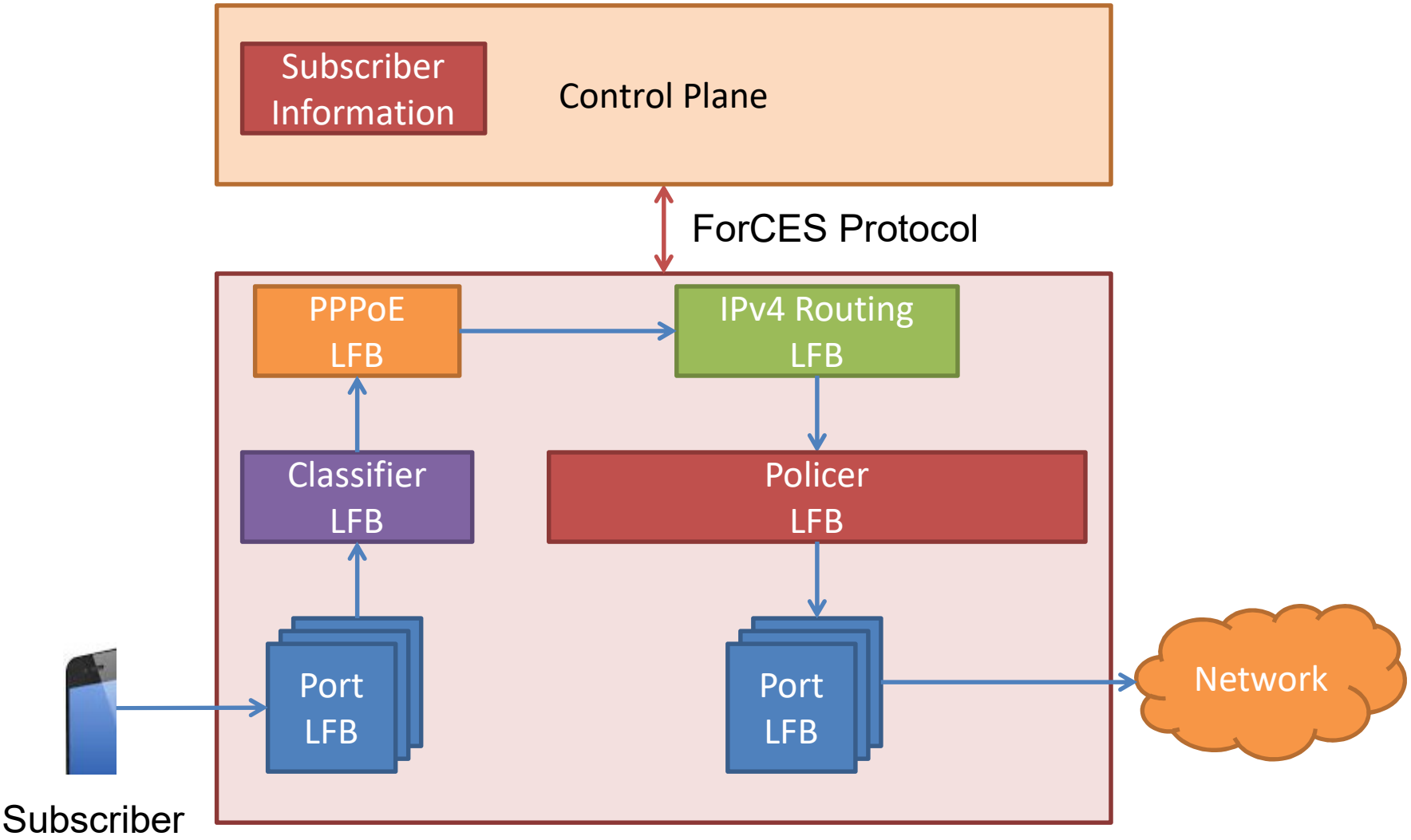
Supporting multiple access types

- Can support any kind of access type
  - Fixed
  - Mobile
- Requires
  - Definition of LFB class
  - Augment classifier to distinguish different packet types
- **No impact on the protocol**

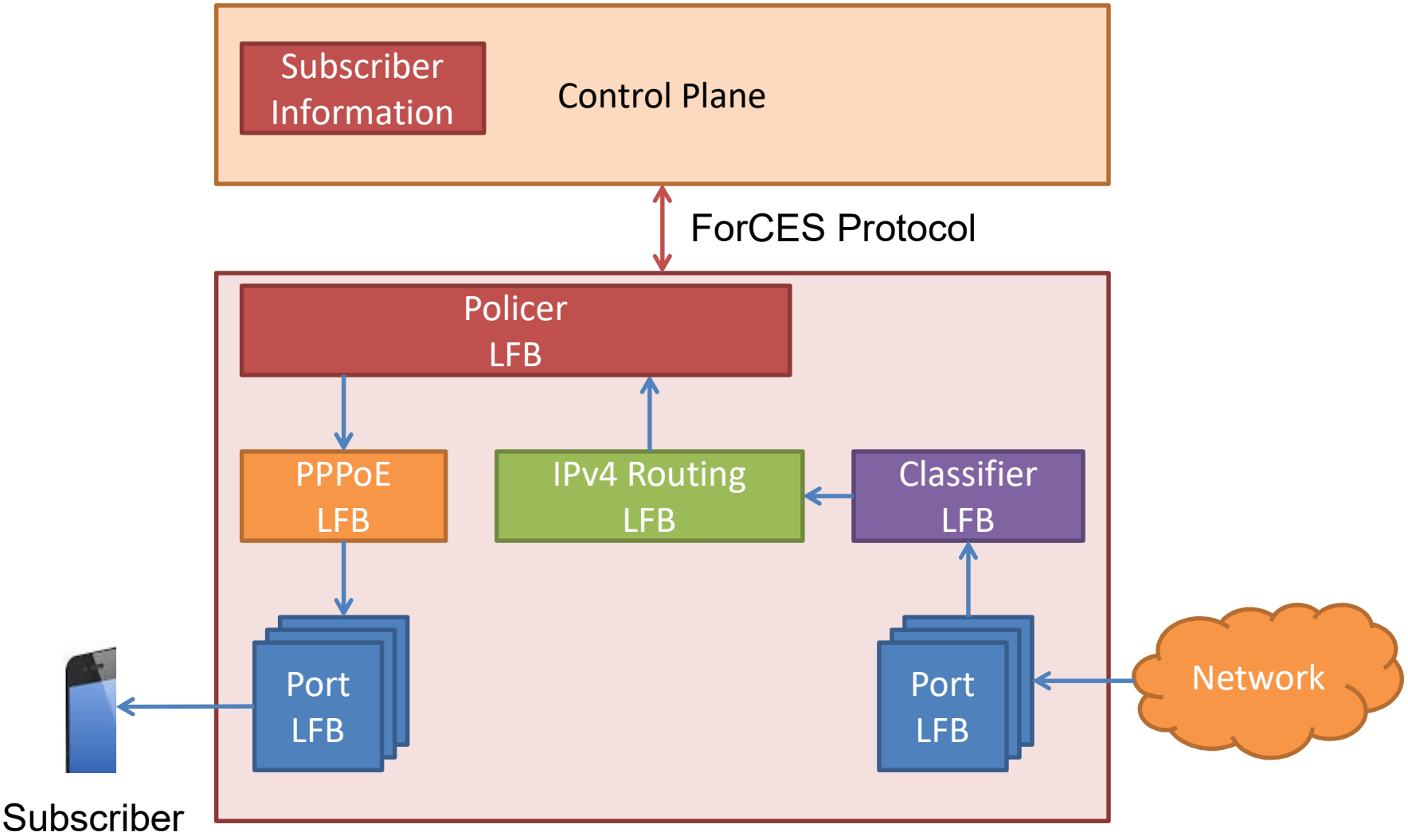
Augmenting BNG Services

- Adding new LFBs in the graphs
  - Bandwidth Management Service (Policer LFB)
  - Stateless access control service (ACL LFB)
  - Quota Enforcement service (QE LFB)
  - Troubleshooting Monitoring (Mirroring LFB)
- **No impact on the protocol**

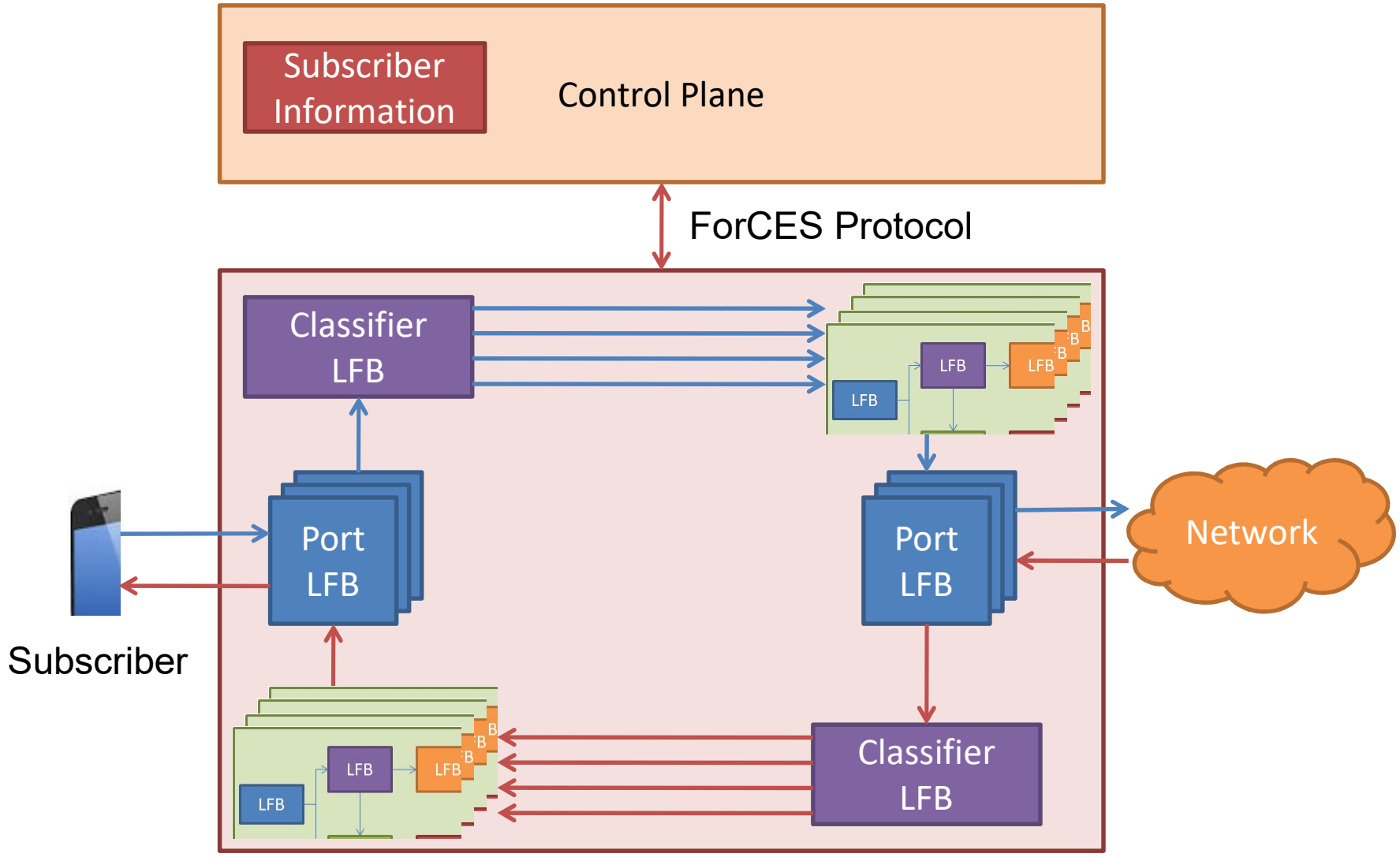
BNG Bandwidth Management Service (Upstream)



BNG Bandwidth Management Service (Downstream)



Advanced Services
Service per Subscriber



Q & A?

- Thanks for listening.
- Questions / Suggestions?

Backup Slides

ForCES Protocol Features

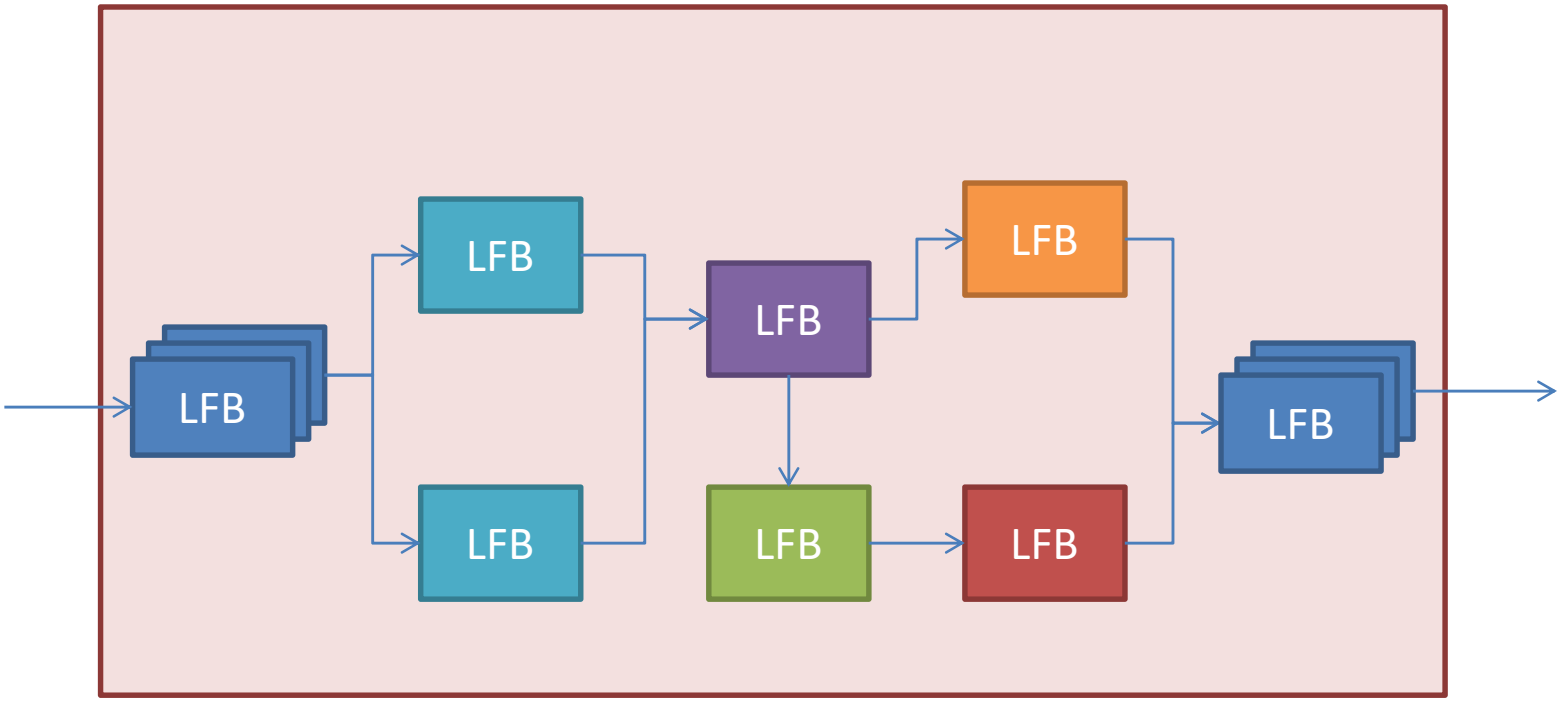
- Transport independence
- Simplified ForCES layer
- Degrees of reliability
- Node overload
- Transactions
- Wire serialization and optimization
- Various execution modes
- Request/Response & Publish/Subscribe
- Simple & Powerful API
- Traffic sensitive heartbeats
- Dynamic association between FEs/CEs

ForCES Model

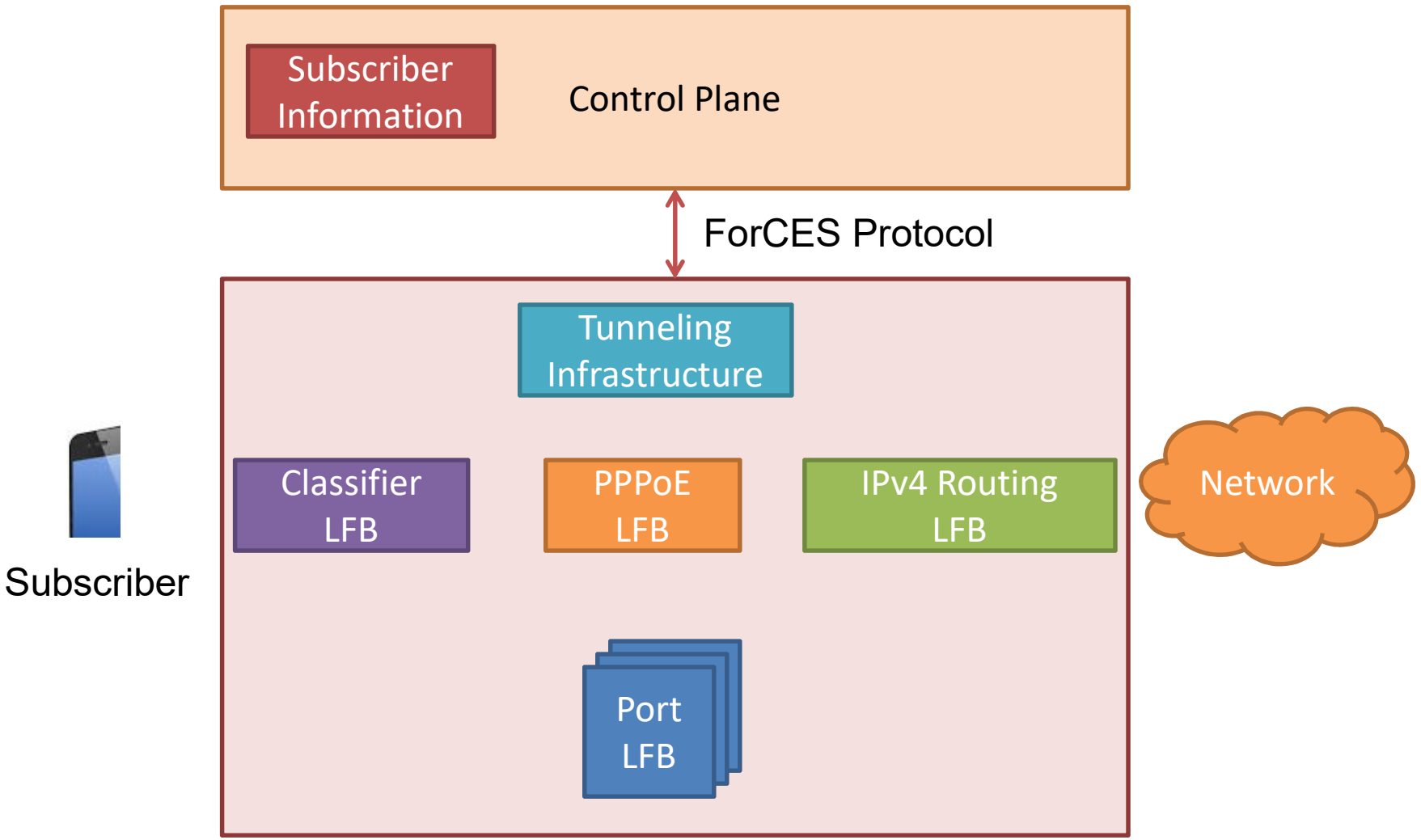
- Data model modularity
- Hierarchical Data model definition
- Metadata modeling
- Publish/subscribe LFB events
- Flexibility/extensibility – augments & inheritance
- Backward and forward compatibility with versioning
- Formal constrains for validation

FE

- An FE Contains instances of LFB classes
- A graph of LFBs composes a service
- The graph of LFBs can be configured by the CE



BNG ForCES LFB classes



BNG ForCES LFB classes

- Port LFB
  - Input/Output port for the FE
- Classifier LFB
  - An LFB that can perform matches on protocol fields and decide what to do next (redirect/continue)
- PPPoE LFB
  - An LFB to perform encapsulation and decapsulation of PPPoE/PPP headers
- IPv4 routing LFB
  - An LFB that performs routing

Traffic Monitoring

- Multiple approaches
  - Control Plane Poll LFB (PPPoE)
  - Subscriber to notifications for statistics

Subscriber Information

- Subscriber Information such as:
  - Session ID
  - Subscriber IP address
  - Subscriber MAC Address
- Reside either:
  - Control plane
  - As LFB at the FE

BNG Use case

- Authenticate Subscriber
- Authorize Subscriber
- Monitor Subscriber Traffic