



802.21, L2 Triggers A Strawman Proposal

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Purpose (of these slides)



- Introduce 802.21
- Describe straw man L2 triggers model
- Solicit feedback

802.21



- Approved as a full IEEE WG Feb 27th
- Has been meeting as an ECSG for 1 year
- Initial charter to study handover between
 - 802.x \Leftrightarrow 802.x (where handover not supported)
 - 802.x \Leftrightarrow 802.y (where x may not equal y)
 - 802.x \Leftrightarrow Non 802 (e.g. cellular)
- Now has approved PAR for ‘Media Independent Handover Services’

Current Work



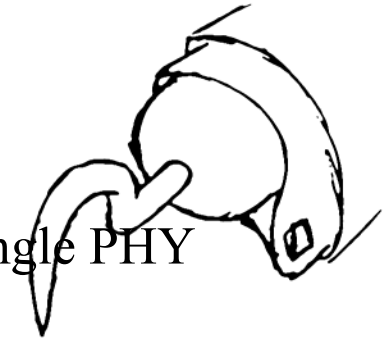
- DNA
 - Put in place useful L2 network detection mechanisms
- Handover Optimization
 - Handover information definition and transport
 - L2 Triggers
- Other
 - Cellular coupling methods

Trigger Sources



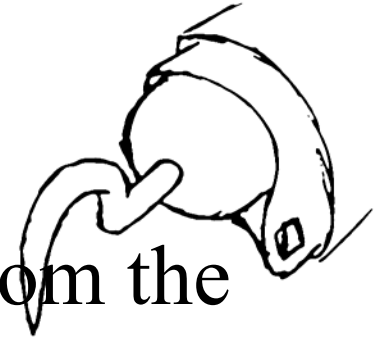
- Knowledge of L2 state changes may derive from the MAC, PHY or decisions made above the MAC and communicated to it through the MAC SAP
 - They may arise from either the local or far end of a link
 - The source of a trigger may dictate the appropriate response to a trigger
- Therefore a trigger should be annotated with its source PHY, MAC, Above MAC, local or remote
- In shared media, the source may need to be a MAC address to distinguish between multiple endpoints

Trigger Destinations



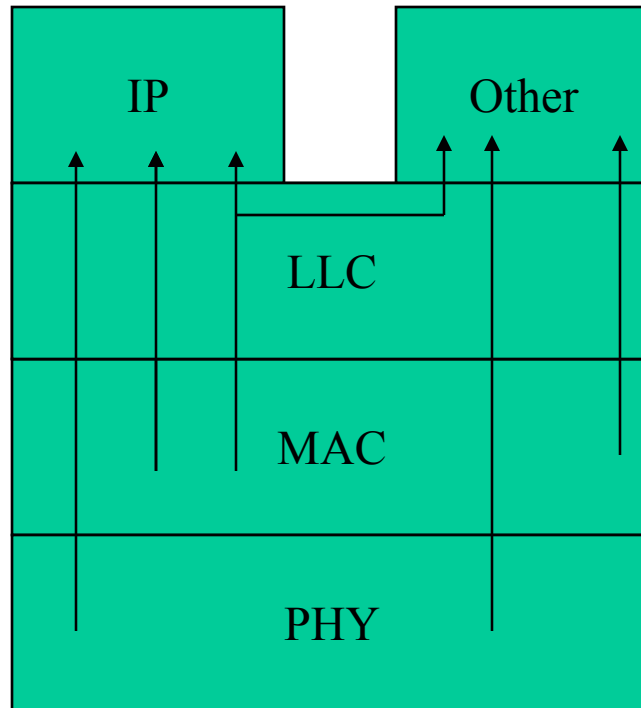
- The 802 model allows for multiple L3 entities above a single PHY through the 802.2 LLC
 - Each L3 entity may comprehend some, all or no L2 triggers
 - It would be inappropriate to push triggers up to L3 entities that do not comprehend those triggers
 - It will be necessary for a trigger comprehended by multiple L3 entities to be passed to all of them
 - We don't want or need to send duplicates over a transport in the case of remote triggers
- So triggers with multiple destinations get forked at the L2/L3 interface and delivered to all L3 entities that have an interest in the type of trigger being delivered
- For the delivery mechanism to know which triggers each L3 entity is interested in, each L3 entity must solicit the trigger types it comprehends

Trigger Transport

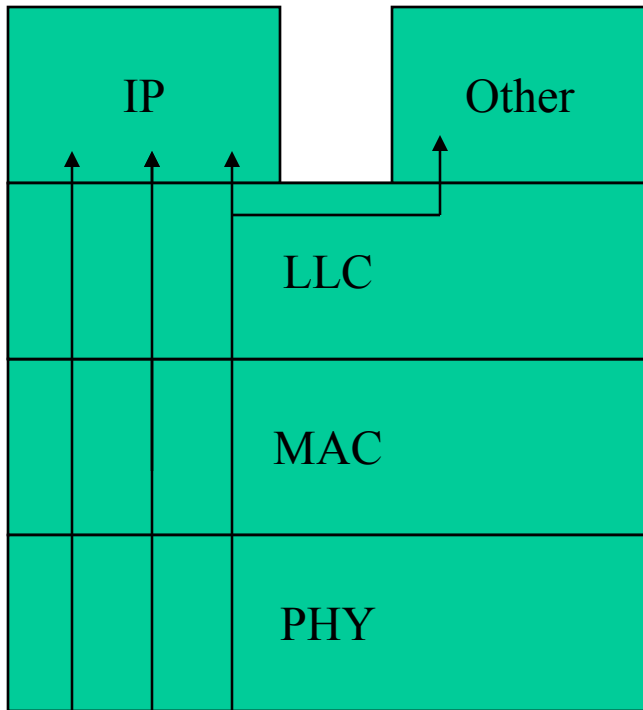


- If a layer 2 trigger can be sourced from the other end of a link, then a layer 2 transport for it must be provided

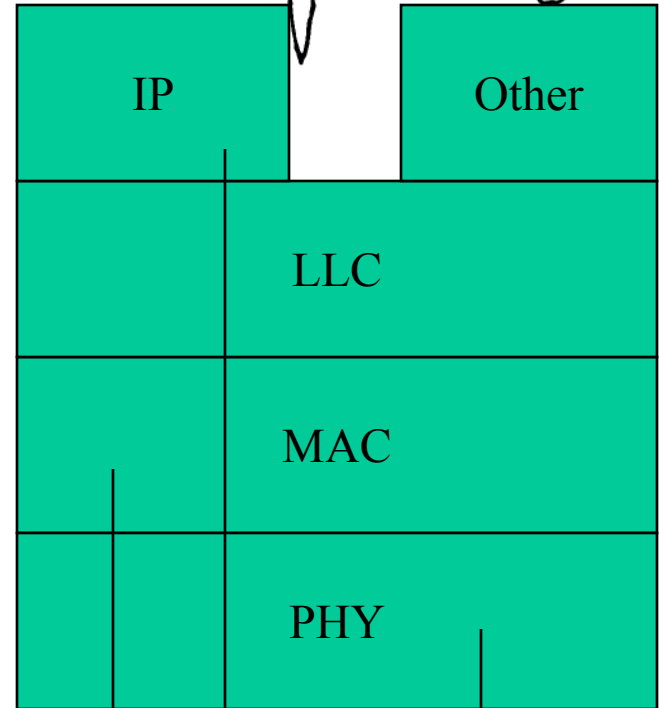
Local Triggers



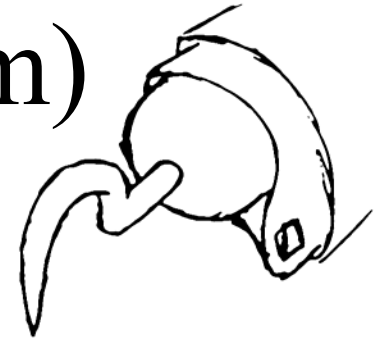
Link Traversing Triggers



- Trigger sent down the stack to appear at remote end of link
- Requires a transport
- Could originate from upper layer

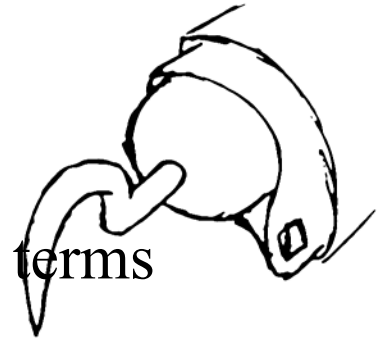


Trigger Types (2 of them)



- Event Triggers
 - Indicate a L2 event, such as a state change
 - E.G. Link_Up, Link_Down
- Predictive Triggers
 - Indicate a future event
 - E.G. Link_Going_Down
 - Must be bounded to minimize state requirements. So must include a finite duration
 - Predictions are generally unreliable, so indicate a confidence level (%)
 - Can be rolled back before expiry if it is found that the future trigger is not likely to happen
 - For a rollback to identify the predictive trigger that it is rolling back, each predictive trigger must be tagged with an ID

Trigger Semantics



- To be useful to L3, trigger semantics must be in terms relevant to L3
 - Link layer SQMs are pretty useless
 - The safe passage of class 1 frames is critical
- It is the responsibility of the lower media specification or of an implementation to map the L2 state to the trigger semantics
 - E.G. In 802.11, Link_Up means 802.11i authentication, key exchange and group key exchange has completed successfully. In 802.16 it means a dynamic transport connection has been provisioned, following network entry and PKM auth.

The Service



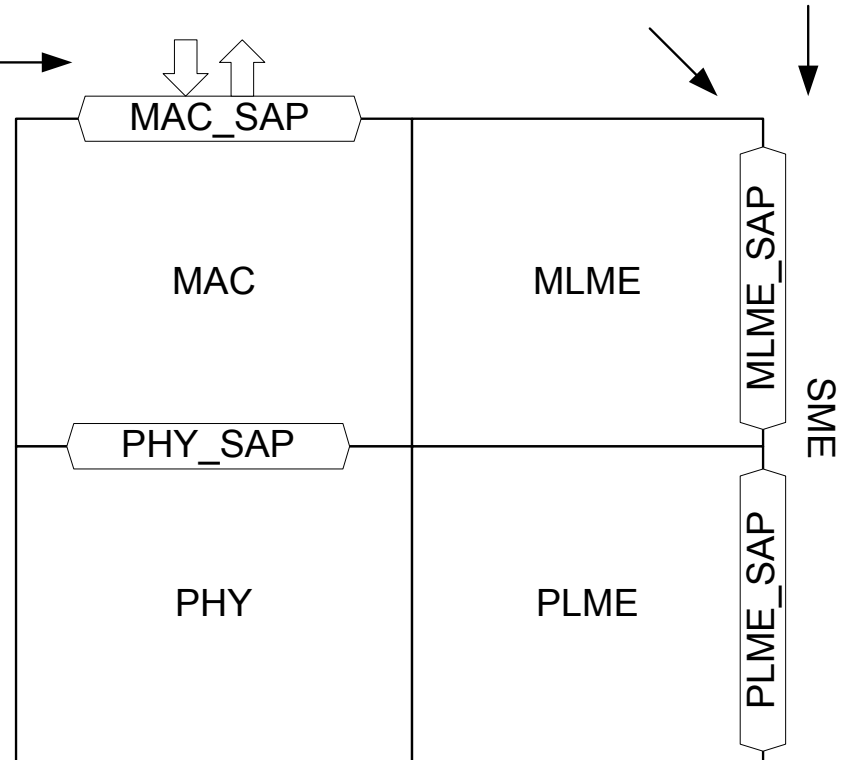
**MAC_SAP Messages
Defined within base MAC
Spec (802.3/11/16)**

+

**MAC_SAP Messages
Defined within HO Spec
802.x[.y]**

Pass triggers and/or roaming
decision data through management
interface?

Messages are generic, E.G.:
Link_up
Link_down
Link_event_pre_indication(what,when)
Handoff_request(where, why)
Fetch_base_descriptor(from where)
MAC and PHY implementations determin
mapping to these based on their own
special cases



Trigger Base Set

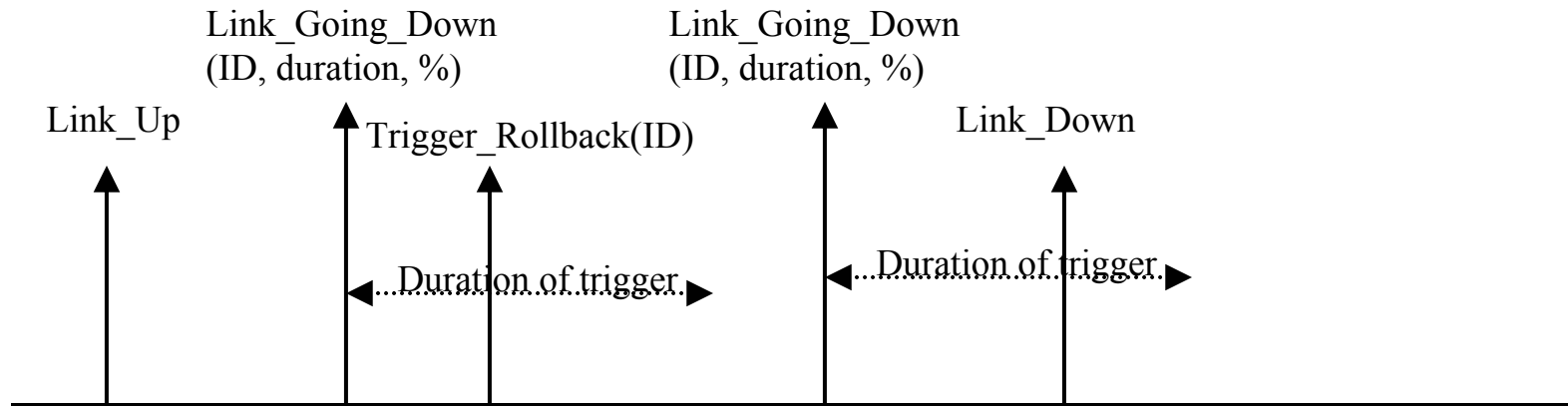


- Link_Up
- Link_Down
- Link_Going_Up
- Link_Going_Down
- Trigger_Rollback
- Link_Quality_Crosses_Threshold
- Better_Signal_Quality_AP_Available

Example



- Link Going Down, leading to a handover



Feedback?



- We need to specify triggers that are useful to external groups such as the IETF
 - Straw man proposal is intended to stimulate a process that will lead to agreement and closure on a trigger model and base set of triggers that are acceptable to 802.21 and the IETF (and others, E.G. 3GPP*)



Where to Look



- <http://www.ieee802.org/handoff>
 - Details for the mailing list `stds-802-handoff` are there
 - Unlike some IEEE 802 lists, its open to all
- “A Generalized Model for Link Layer Triggers”, Vivek Gupta, David Johnston.
 - http://www.ieee802.org/handoff/march04_meeting_docs/Generalized_triggers-02.pdf