

Mobility and Layer Interaction Design

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Background

- Mobility on the Internet is being driven by the emergence of multi-radio devices and networks (WiFi, Cellular, Wimax) that support them
 - Network diversity
- Variety of applications envisioned: VoIP, Mobile IPTV, Turn-by-turn navigation, peer - peer gaming and more
 - Application variety, Device capability
- Beyond persistence, these applications expect certain level of *performance* in spite of mobility

Outline

- Consider the performance bottlenecks during mobility and layer interaction as a solution
- Consider some layer interaction modes, architectural implications and relative merits
- Identify problems of broader scope involving network diversity and application variety

Requirement on Design

Meet application performance needs while making use of network diversity and device capability

When a Handover happens, a Mobile Node has to

- Acquire a new link
 - Scanning, synchronization and attachment
 - Access control and key exchange
 - Acquire new IP
 - Router discovery
 - DHCP, DAD
 - Update Route
 - Inform an agent
 - Inform correspondents
 - Update Flow
 - Provide new network profile
 - Affect flow rate?
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- Access Network operations
- end - end operations

Layer Interaction (1/4)

What do you get?

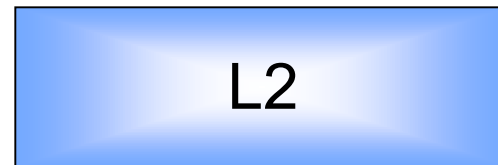
- Fast Link Status delivery
- Link Profile information
- Link switching from IP

Considerations:

- Reliability of information
- What to do with Link Profile?



Link Up, Down
Link Type, Profile



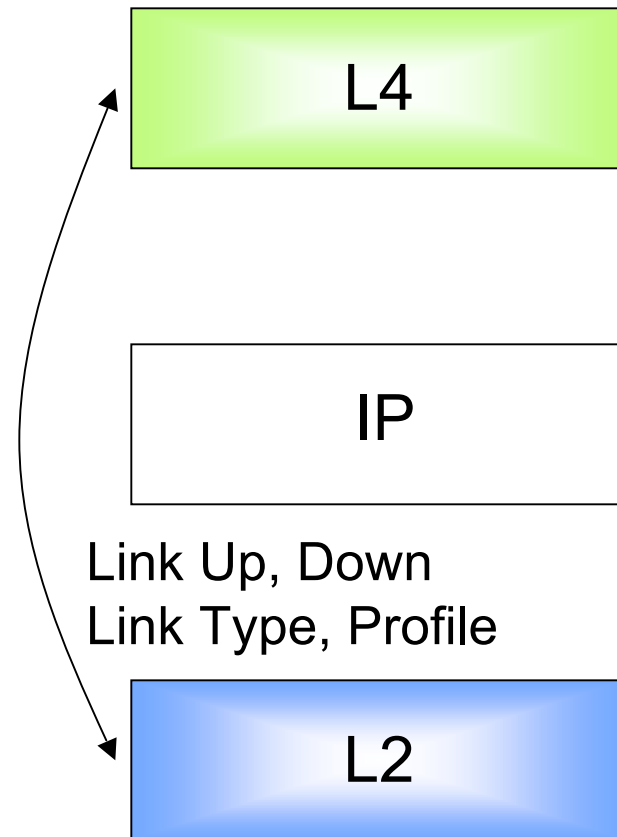
Layer Interaction (2/4)

What do you get?

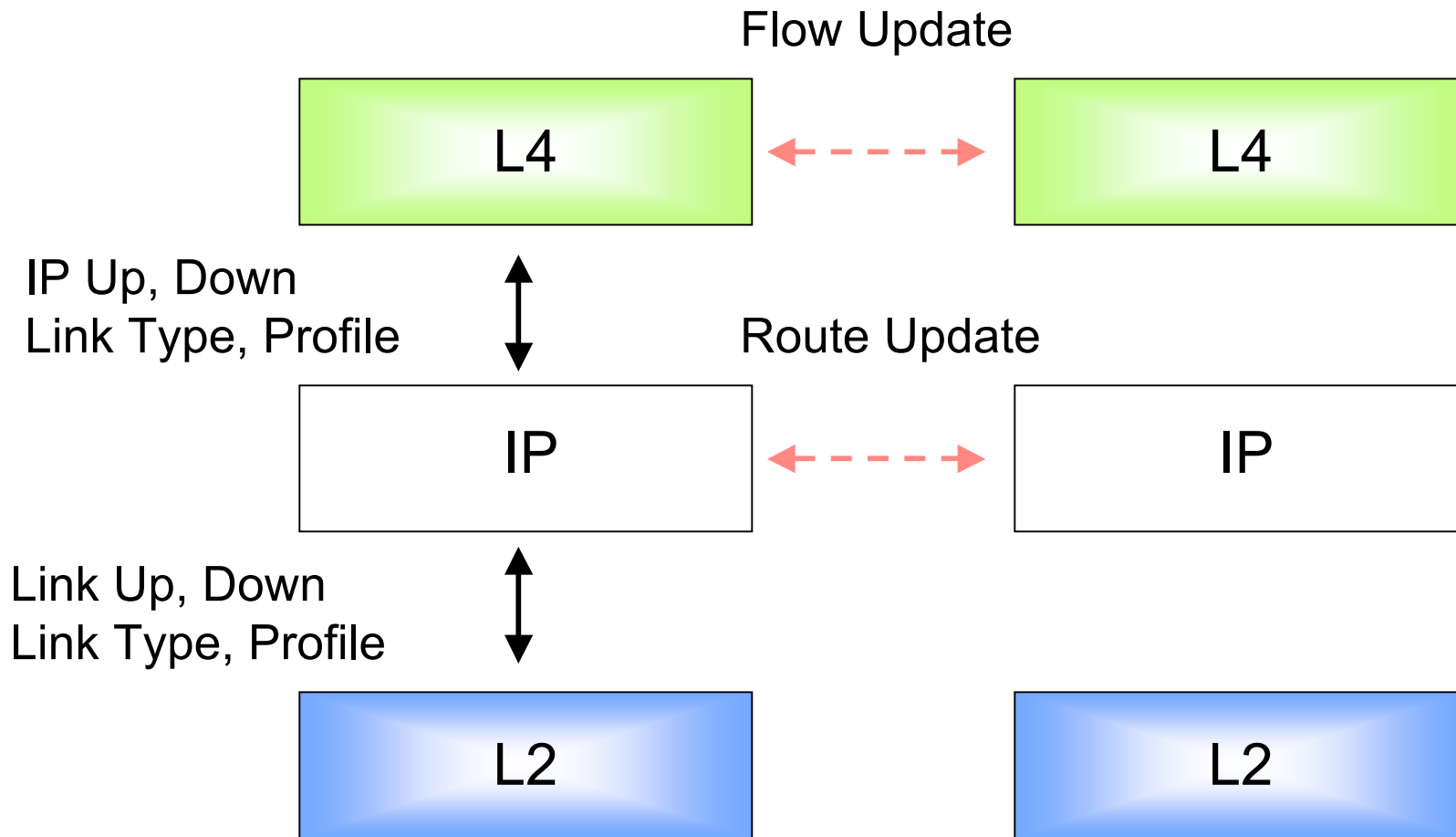
- Direct Link Status Information
- Transmit rate control
- Microsoft Windows media sensing

Considerations:

- L4 still depends on IP Up
- Receive rate adaptation needs new end-end signaling
- Could L4 directly affect L2 state?
- draft-iab-link-indications

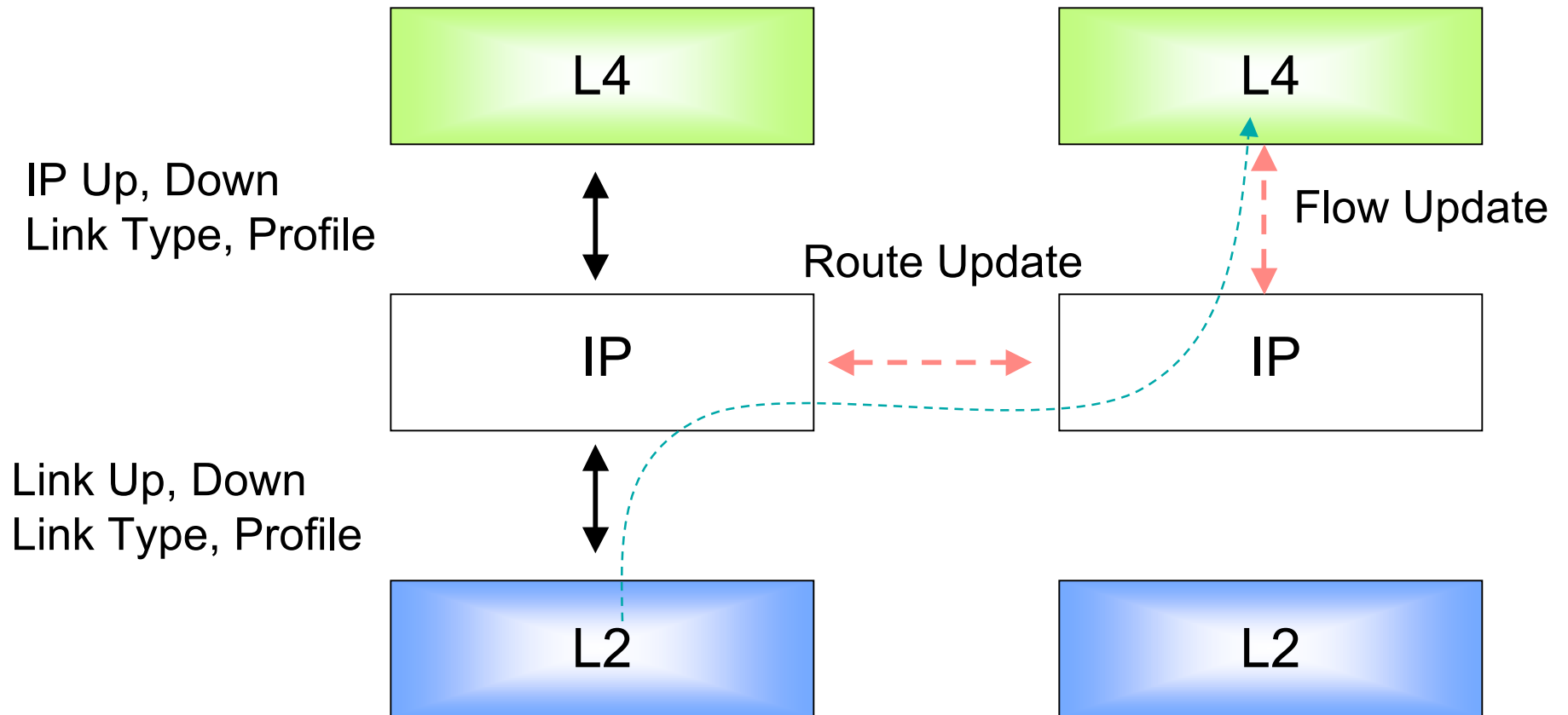


Layer Interaction (3/4)



Clear layer separation. However..
IP delay dominates RTT

Layer Interaction (4/4)



Movement Detection, IP Configuration and Route Update become the bottleneck. Need Fast Access Operations.

Summary

- Each layer needs optimization
- Each layer needs to be able to communicate with adjoining layers, in a link-independent way
- Interaction between layers is beneficial (perhaps even needed), but has implications on design

IP-driven Fast Handovers



draft-irtf-mobopts-l2-abstractions

Mobility with Network Diversity, Application Variety

