

Fast Layer 2 Handoff Between WLAN and 3G Cellular Networks

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Defense Information Systems Agency

The logo for the MITRE Technology Program, featuring a stylized graphic of stacked blocks in yellow, orange, and blue to the left of the text.

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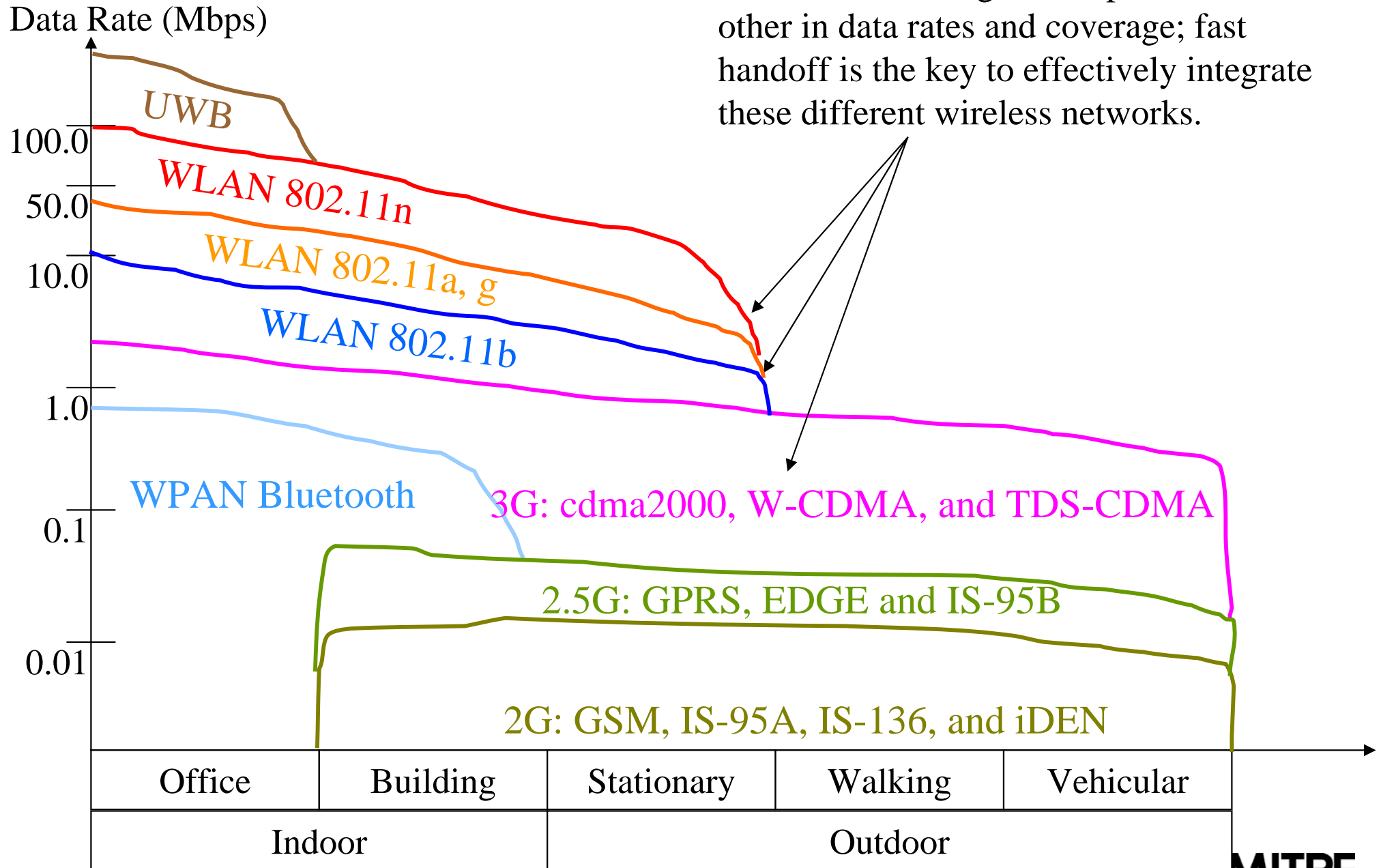
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Problem

- With the massive deployment of 3G cdma2000/W-CDMA cellular networks and WLAN hot spots, integration of these two types of networks becomes not only feasible, but also necessary, since they provide complementary coverage and services.
- One of the challenges for integration is to provide security persistence for different applications, session persistence for data, and service persistence for voice.
- It may be possible to apply the new methodology to perform fast handoffs between DoD tactical wireless technologies.

Background

Wireless technologies complement each other in data rates and coverage; fast handoff is the key to effectively integrate these different wireless networks.



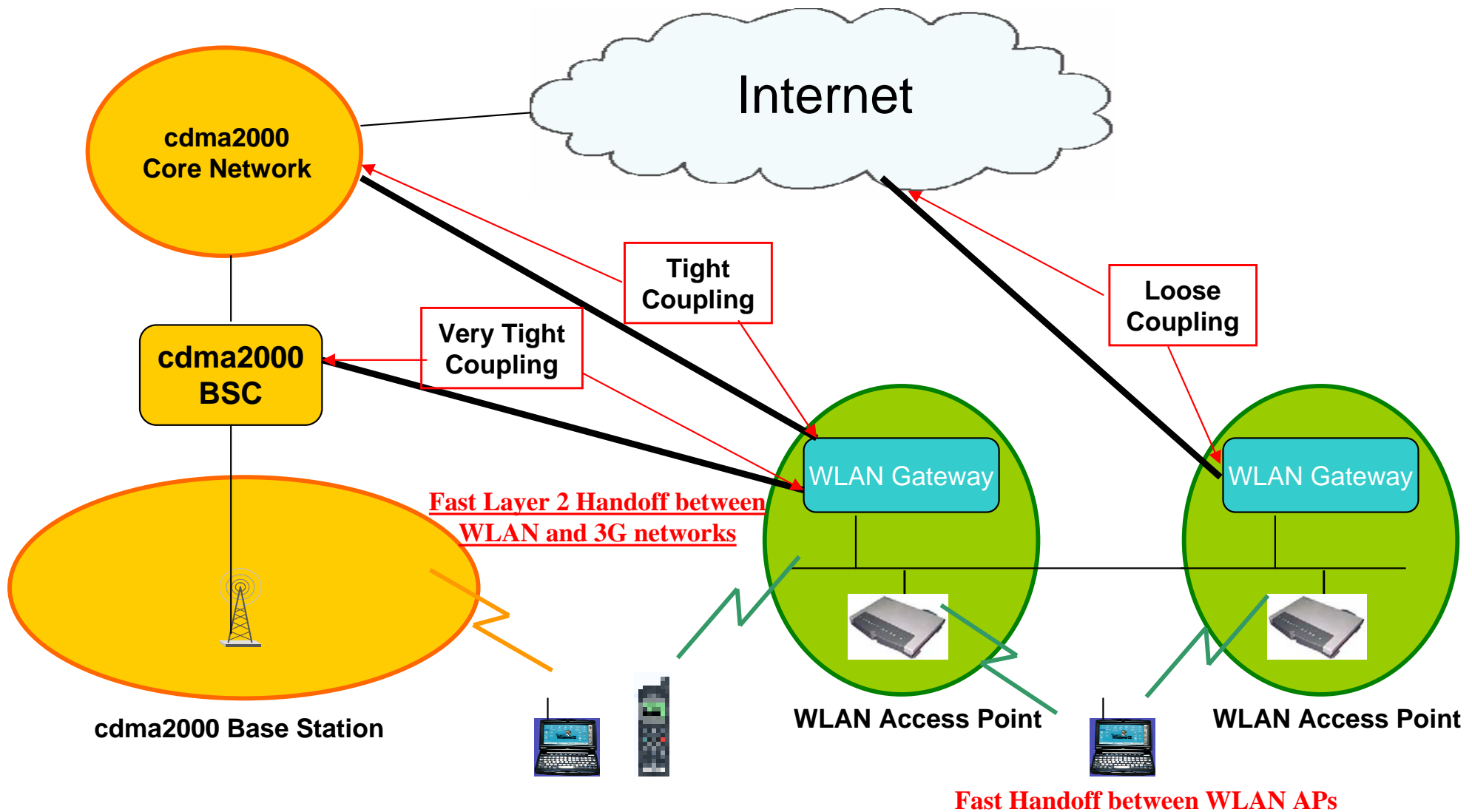
Objective

- **The purpose is to propose innovative fast layer 2 handoff algorithms between WLAN and 3G cellular networks for voice services.**
- **The effectiveness of the proposed handoff algorithms will be evaluated using the Wireless Interworking Test Bed (simulation) and Washington Mobile Computing Lab (WMCL) and DISA DForce Technical Analysis Center Lab experimentation.**

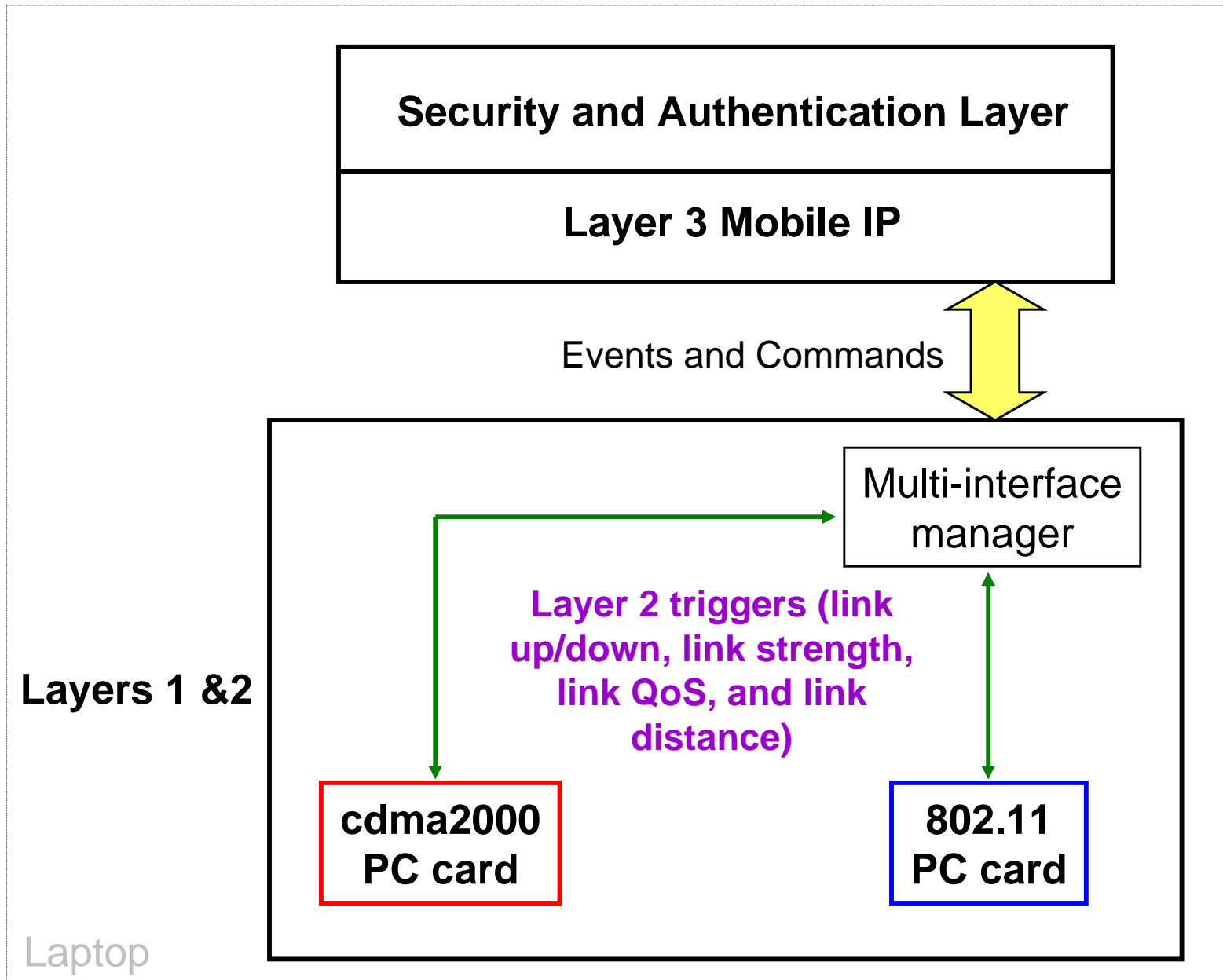
Activities

- **This project has three main activities:**
 - **The first is to develop the Wireless Interworking Test Bed to simulate the performance of proposed fast layer 2 handoff algorithms.**
 - **The second is to work with third-party wireless roaming/handoff gateway vendors to perform WMCL & DISA DTAC Lab experimentation to validate the simulation results.**
 - **The third is to submit contributions to IEEE 802.11/IEEE 802.21 standards to alter the direction of the standards to meet the government's requirements.**

Highlight: Loose Vs. Tight Coupling



Highlight: Layer 2 Triggers Experimentation



Impacts

- **The results are used to submit contributions to IEEE 802.11 and IEEE 802.21 Working Groups such that the direction of IEEE 802 fast handoff standards development can be altered based on the government's (DISA) requirements (e.g. security and QOS).**
 - **Six contributions were submitted to IEEE 802.21 WG.**
 - **Two joint contributions (with SAMSUNG, CRL of Japan and Mitsubishi) were submitted to IEEE 802.21 WG.**
 - **Two contributions were submitted to IEEE 802.11 WG.**
- **The research results can be applied to inter-working/handoff between dissimilar tactical wireless technologies such as SATCOM (WIN-T, TCS), WNW (JTRS), SRW (JTRS), and FCS.**

Future Plans

- **Extend the learned methodology to IEEE 802.11 Extended Service Set (ESS) Mesh Networking**
- **Combine MIMO technology with Fast Handoff**
- **Continue to collaborate with service providers and vendors to submit joint contributions to IEEE 802.21/IEEE 802.11 WGs**
- **Extend the learned methodology to inter-working of DOD tactical wireless networks: WIN-T, TCS, JTRS and FCS**