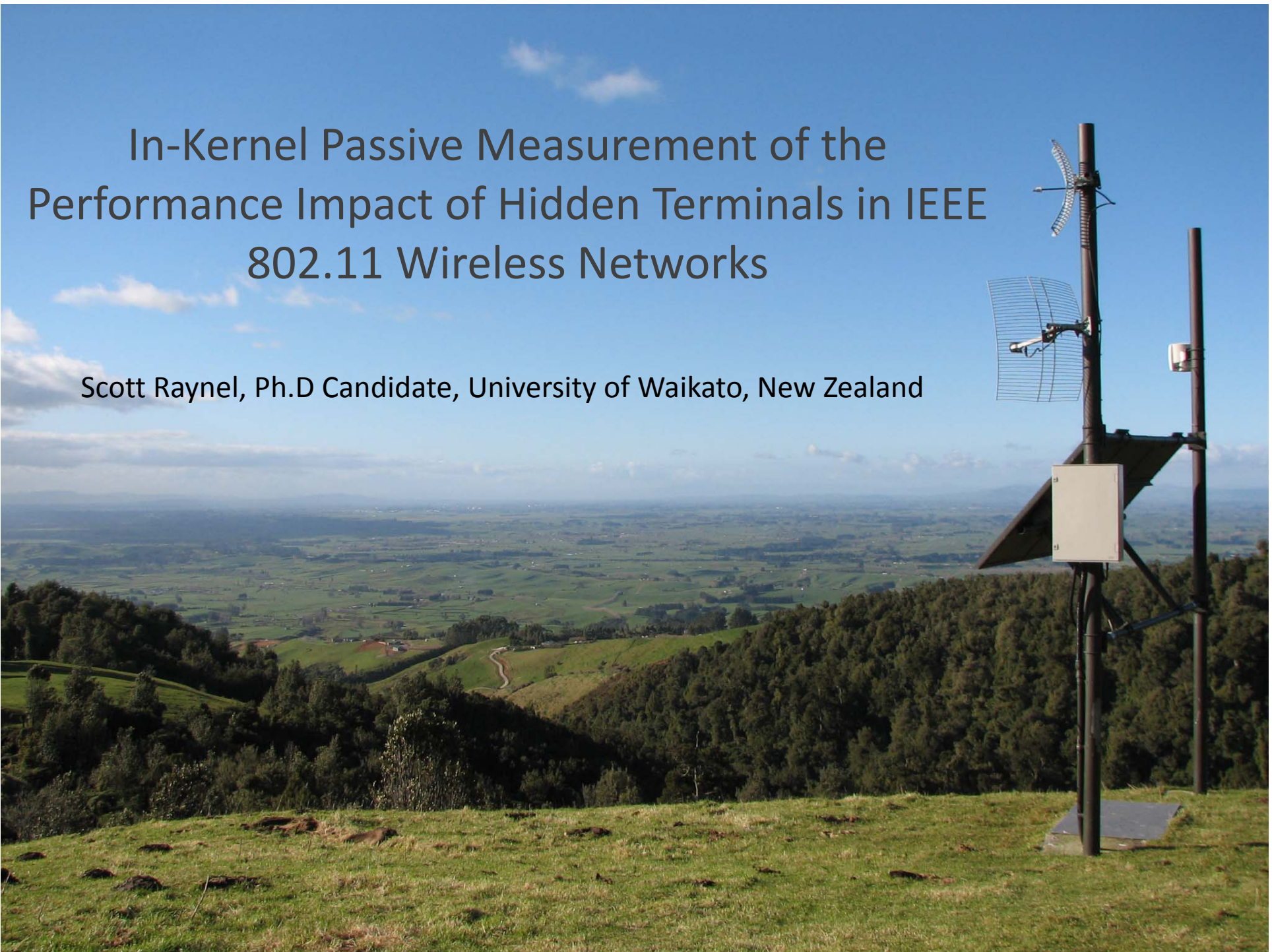


# In-Kernel Passive Measurement of the Performance Impact of Hidden Terminals in IEEE 802.11 Wireless Networks

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# Measurement of Wireless Networks

- Passive external capture
  - “vicinity sniffing”
  
- Passive internal capture
  - Userspace
  - Direct kernel driver modifications

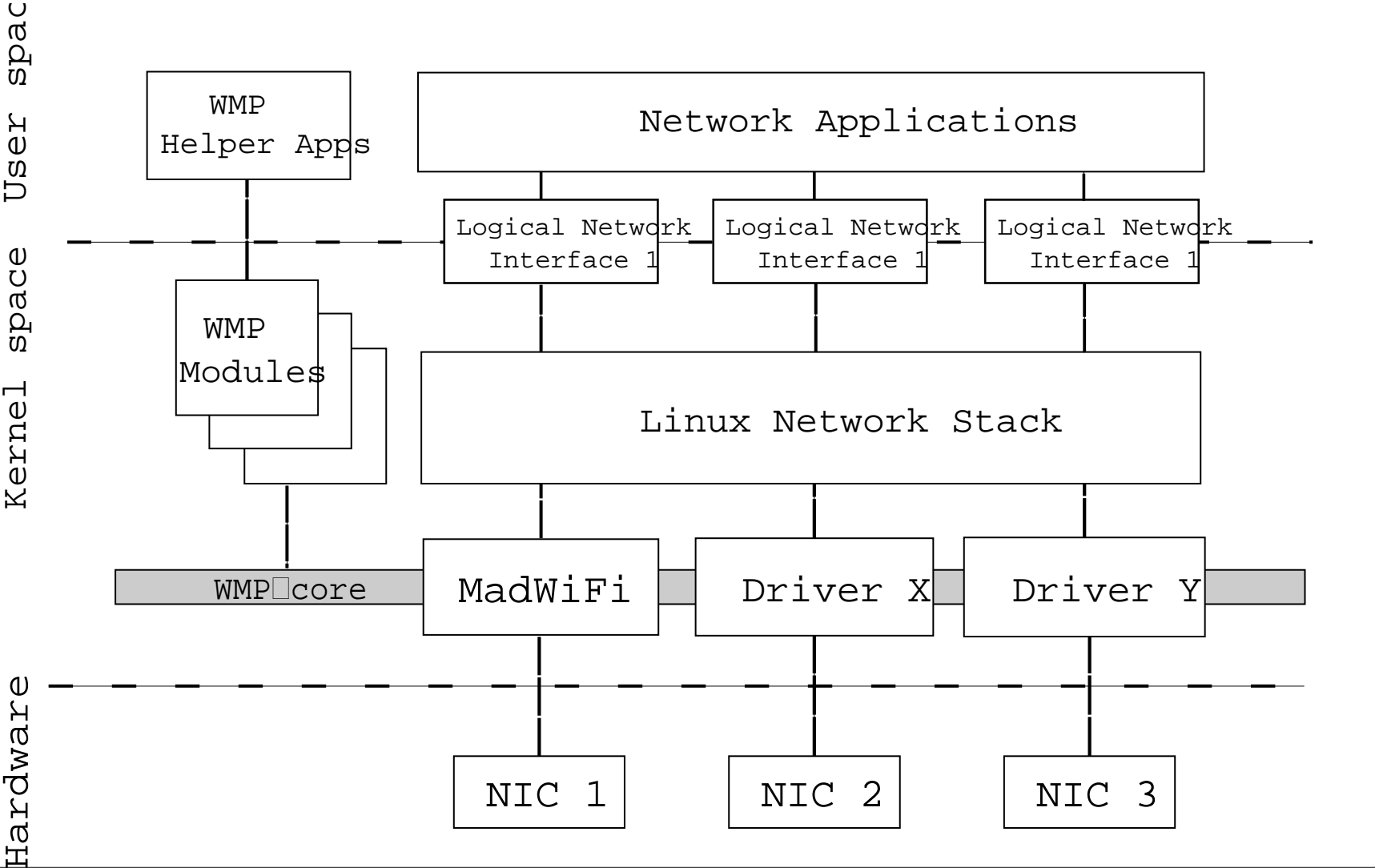
# Measurement of Wireless Networks

- Passive external capture
  - Costly, extra hardware
  - Not an accurate view of measured host
- Passive internal capture
  - Performance impact

# WMP Framework

- In kernel, passive measurement
- Measurement decoupled from drivers
- Zero-copy, low overhead
- Meta-data describing RX/TX

# WMP Framework



# WMP Framework

- Accurate, complete capture
- Reusable measurement code
- Long term measurement
- Wide spread deployment

# Examples

- Commodity wireless measurement
- Community driven networks
- Empower non-expert operators

# Hidden Terminals

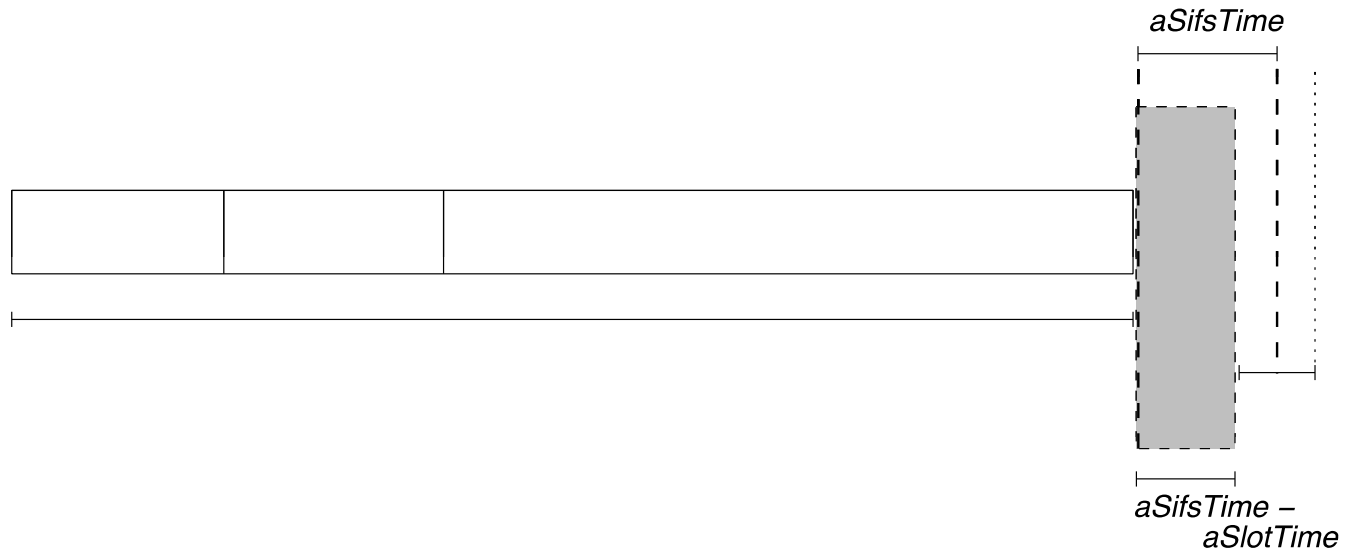
- Classic problem faced by CSMA networks
- Unsynchronised terminals lead to collisions
- Collisions lead to poor network performance
- Other causes for poor performance
- Can we detect HTs as cause?



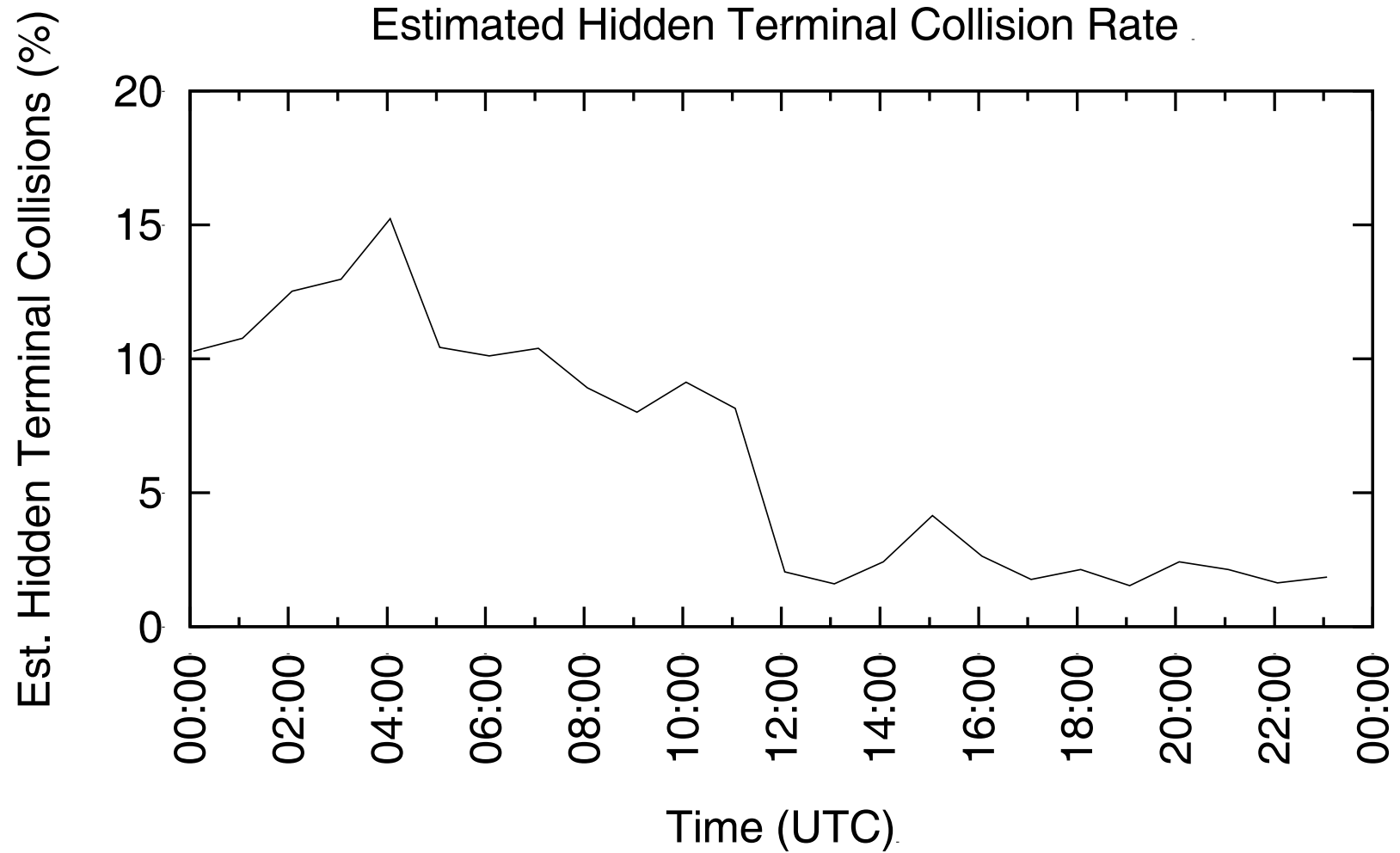
# Measuring Connectivity

L

# Detecting DCF Violations



# Detecting DCF Violations



# Summary

- New framework for commodity wireless measurement
- Novel method for detecting and measuring hidden terminal problems
- Deployed on operational commercial network with useful real-world outcomes

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