SIMULATION OF HANDOFF PROCEDURE

BASED ON SIP OVER WIRELESS LAN

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Road Map

❖ Introduction

❖ Background Overview

  ❖ Wireless LAN and SIP overview

  ❖ SIP mobility support

❖ Implementation in OPNET

❖ Simulation & Performance Evaluation

❖ Conclusion

❖ Future Work

❖ References

Introduction

Motivation and Project Goals:

❖ To set up an OPNET environment where it is possible for us to model, simulate and evaluate:

- ❖ Wireless LAN mobility management in application layer.
- ❖ Handoff procedure based on SIP over Wireless LAN

Introduction

Project Scope:

- ❖ Understanding Wireless LAN mobility and SIP protocol over WLAN
- ❖ Creating network models and setting up simulation environment via OPNET
- ❖ Analyzing and evaluating simulation results

Background Overview

Wireless LAN

- ❖ Wireless Local Area Network: implemented to extend or substitute for a wired LAN.
- ❖ IEEE 802.11: specifications on MAC and physical layer
- ❖ User mobility: between different Access Points within the same subnet

SIP: Session Initiation Protocol

❖ IETF, application-layer signaling protocol

❖ Message Type: Request, Response

❖ Methods: INVITE, ACK, BYE, OPTIONS, CANCEL, REGISTER

❖ Email-like address: user@userdomain

❖ SIP components:
  ❖ User Agent Client (UAC): Initiates Request
  ❖ User Agent Server (UAS): Returns Response
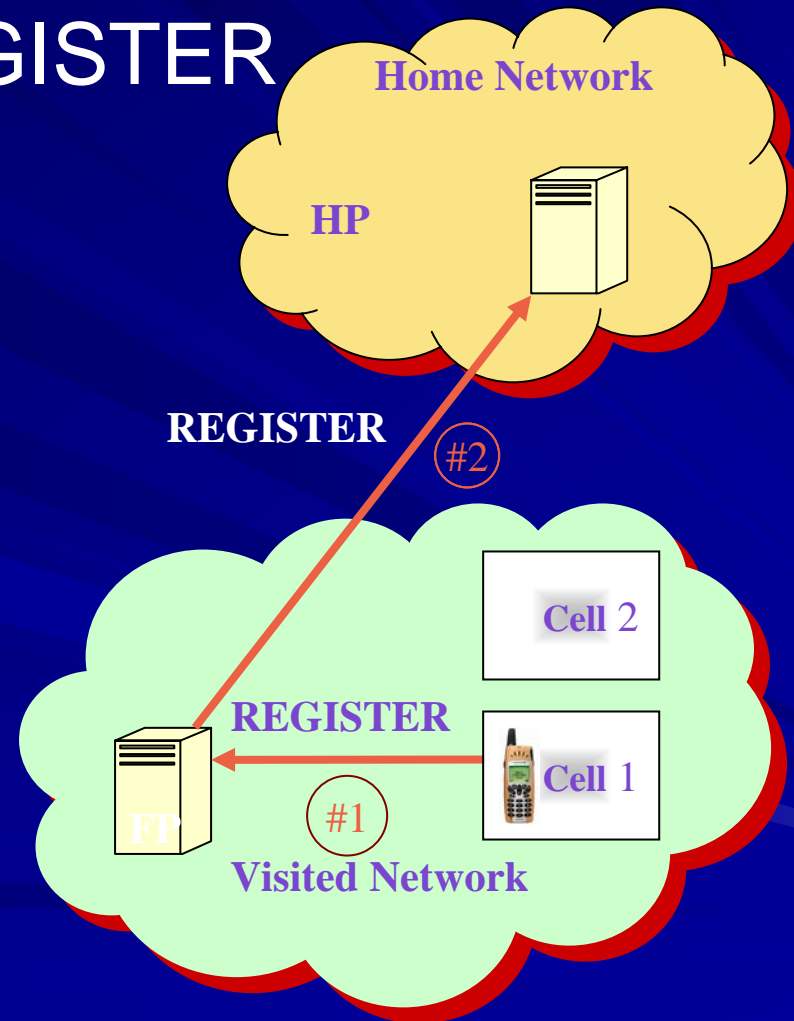
* Internet Engineering Task Force (IETF)

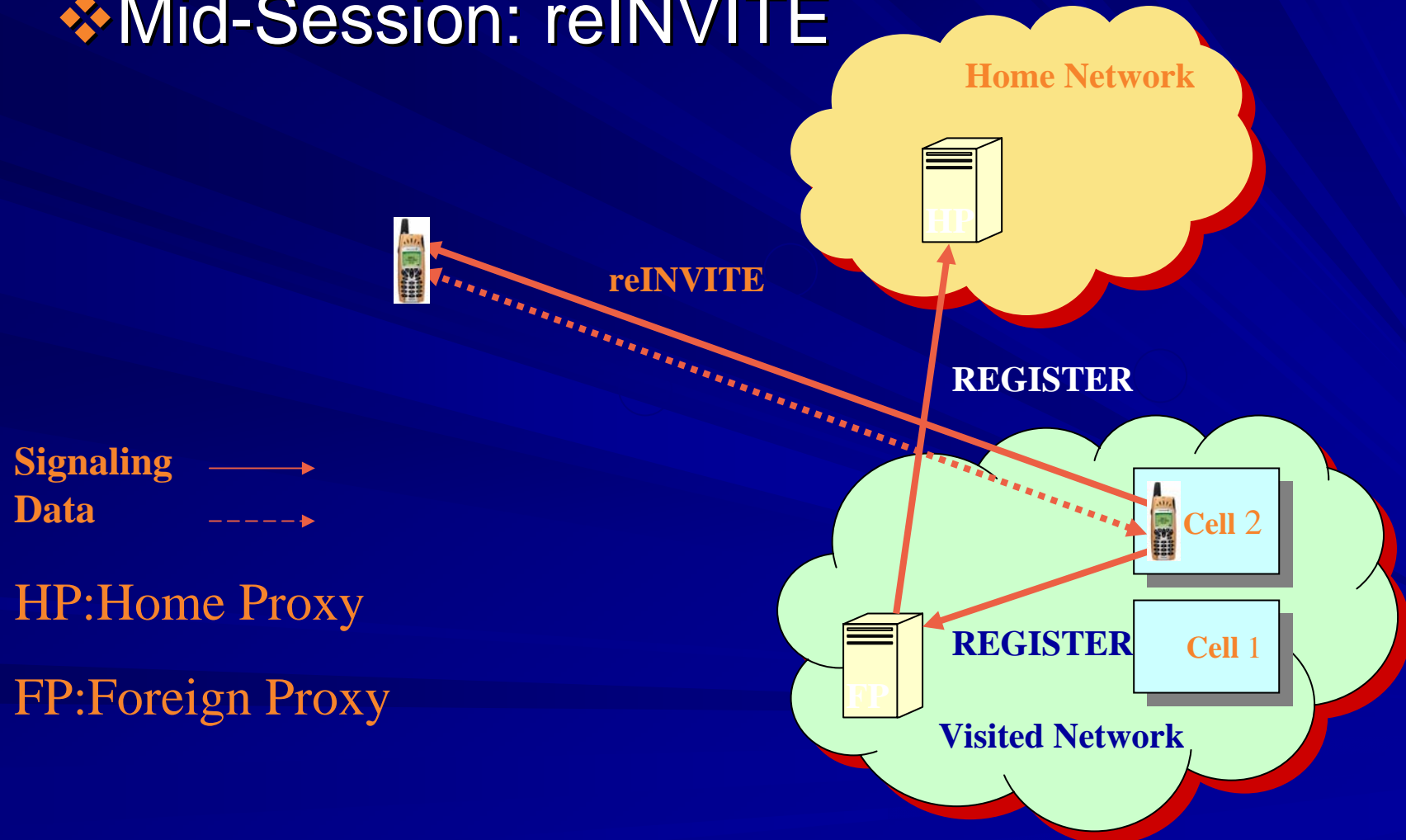# SIP Mobility Support Over WLAN

❖ Pre-session : REGISTER

Home Network

HP

REGISTER
#2

Signaling ⟶

FP: Foreign Proxy

HP:Home Proxy

Cell 2

REGISTER

Cell 1

FP

#1

Visited Network

SIP Support Mobility Over WLAN

❖Mid-Session: reINVITE

Home Network

HP

reINVITE

REGISTER

Signaling ——→
Data - - - - →

HP:Home Proxy

FP:Foreign Proxy

Cell 2

REGISTER   Cell 1

FP

Visited Network
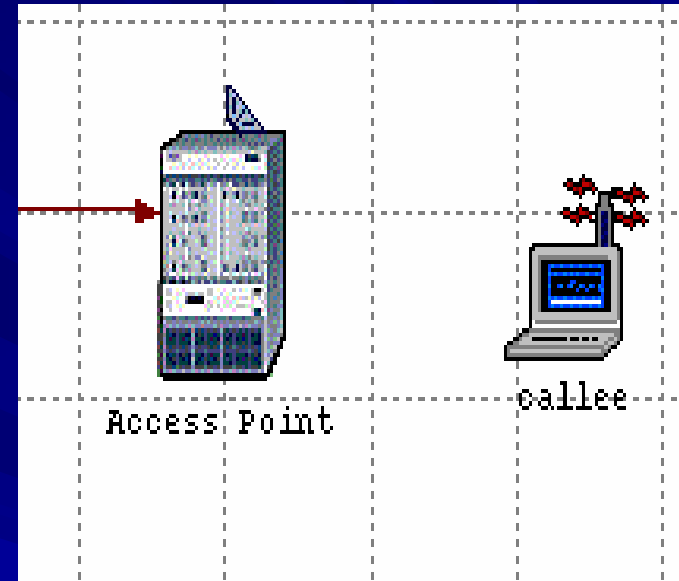
Network Topology
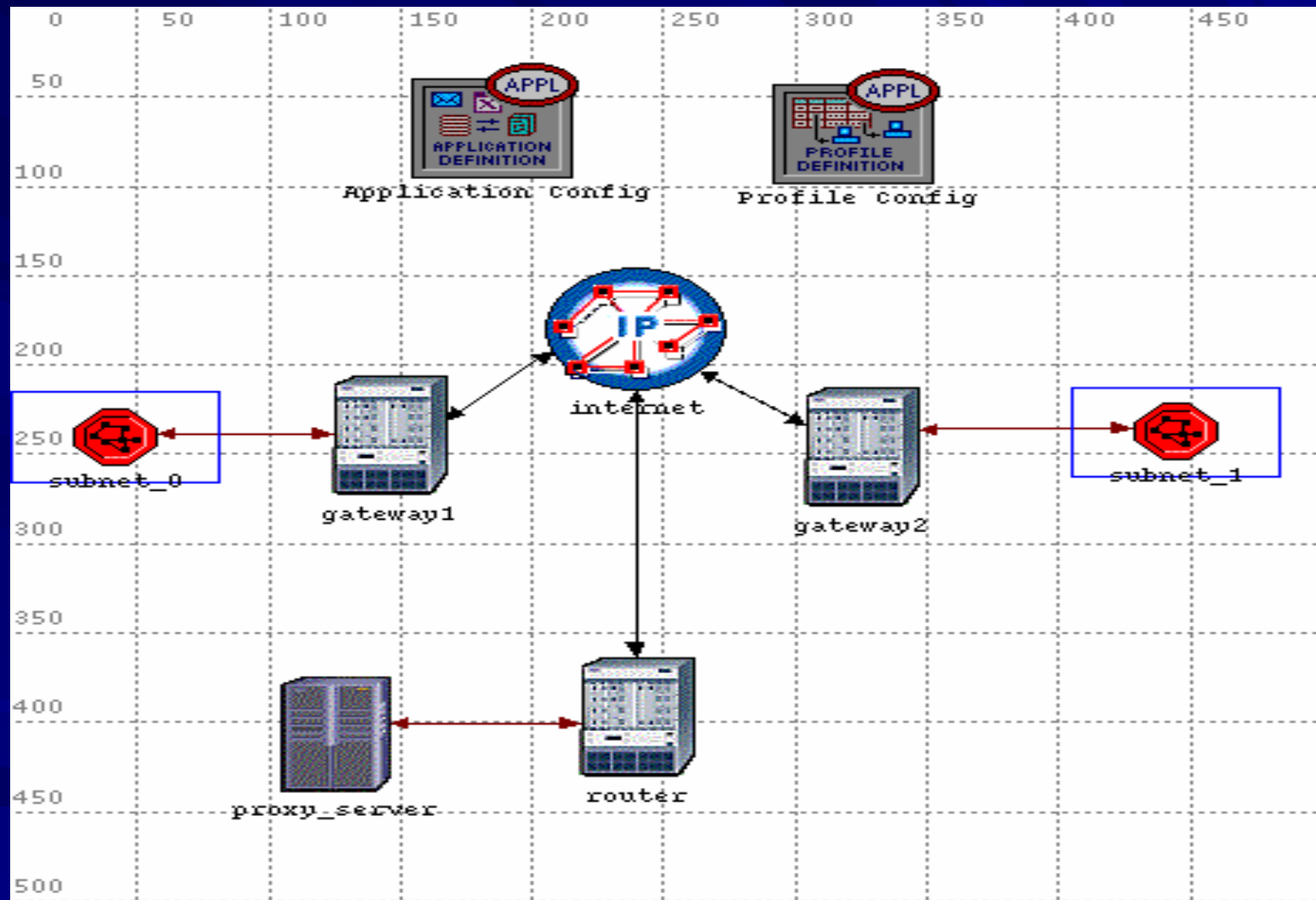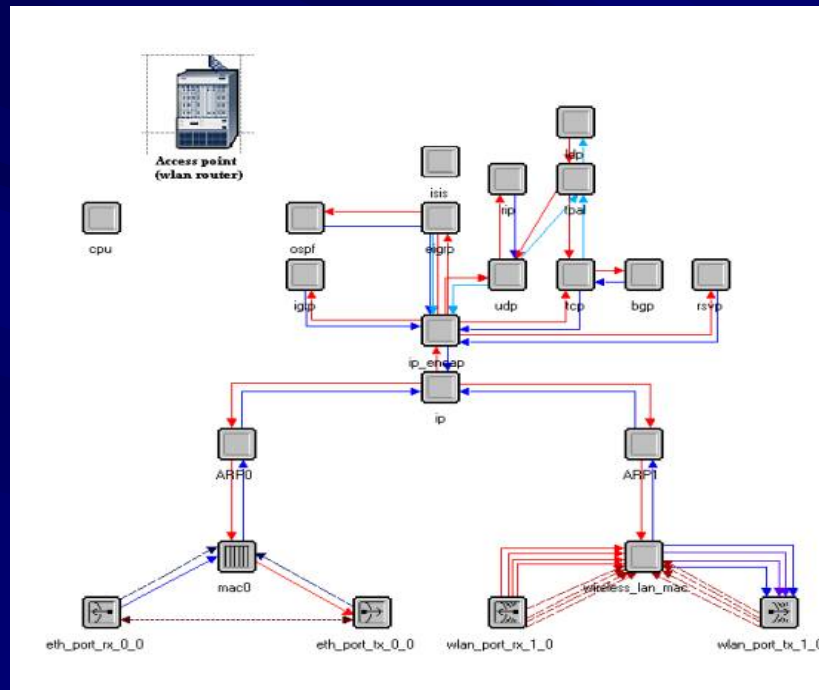
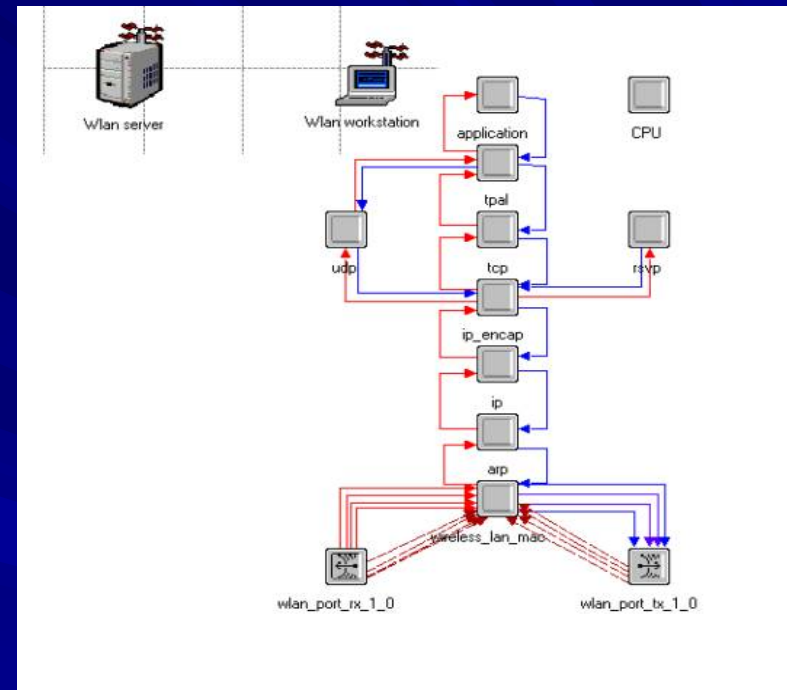# Subnet Topology
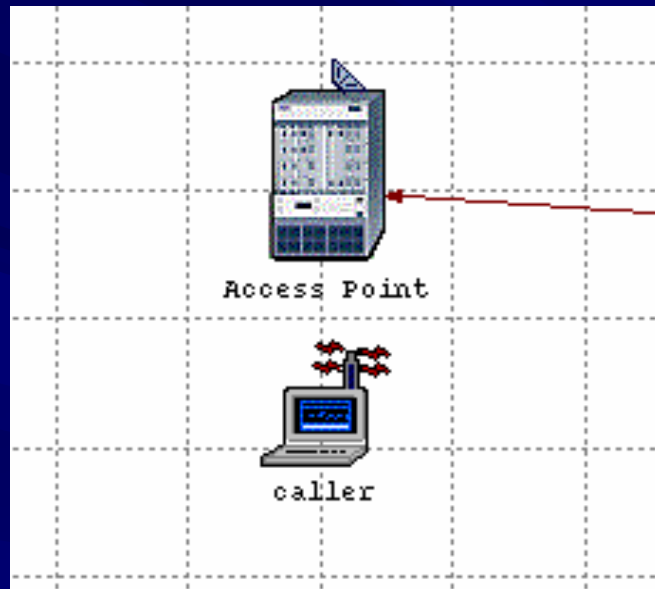
Subnet of Caller side

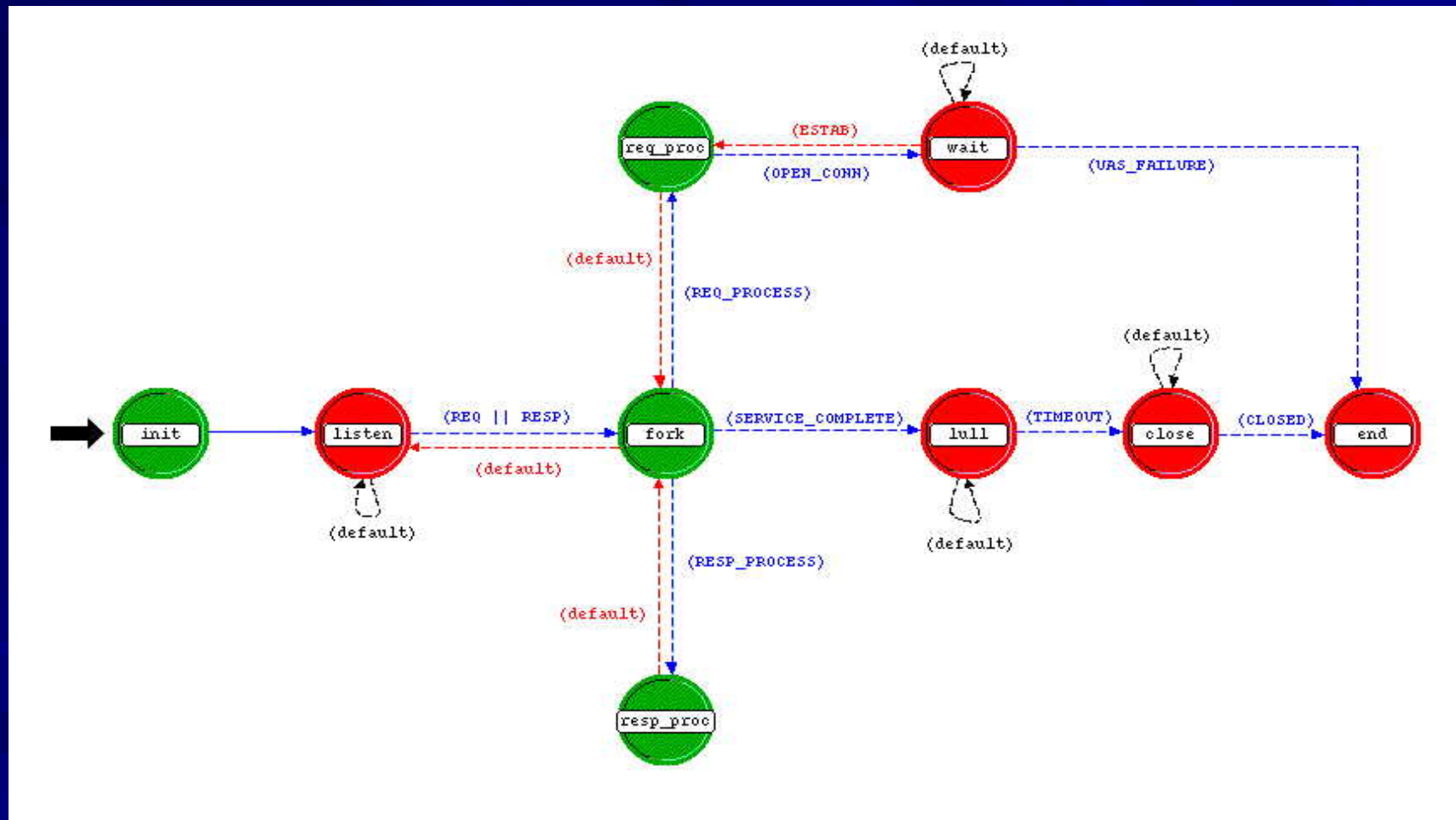**Subnet of Callee side**

WLAN: Access Point & Workstation

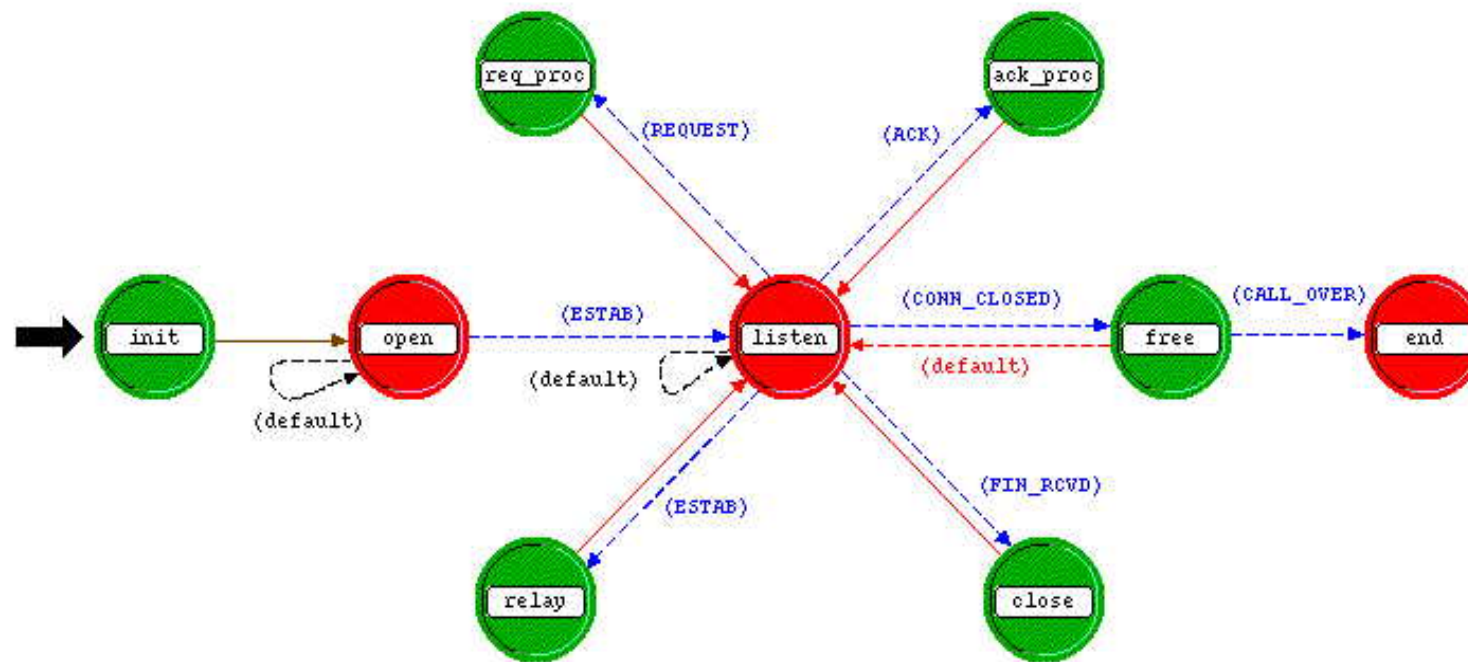**Wireless LAN Access Point (Wireless Router)**
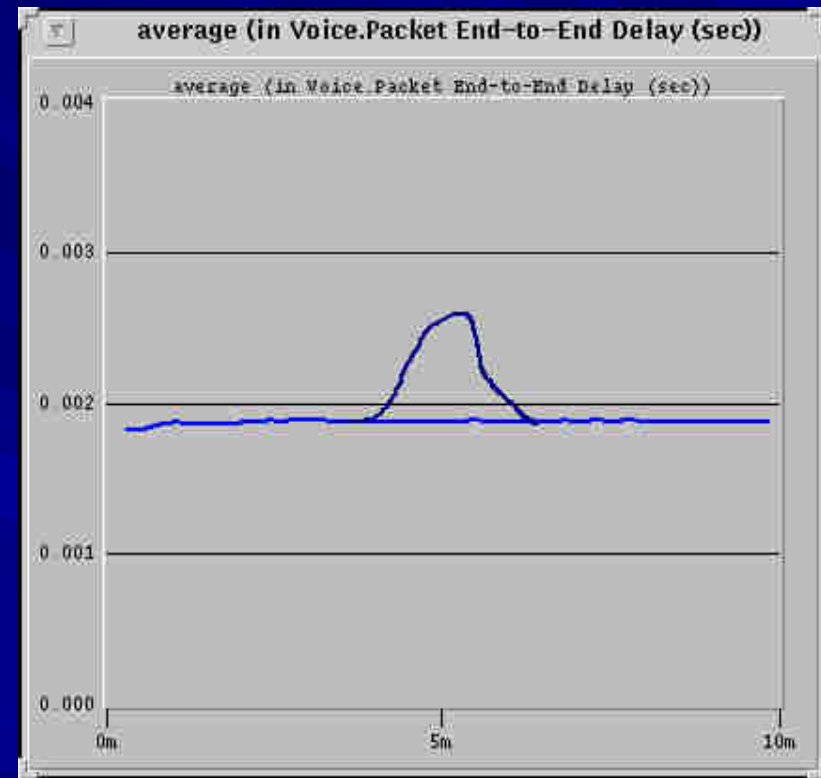

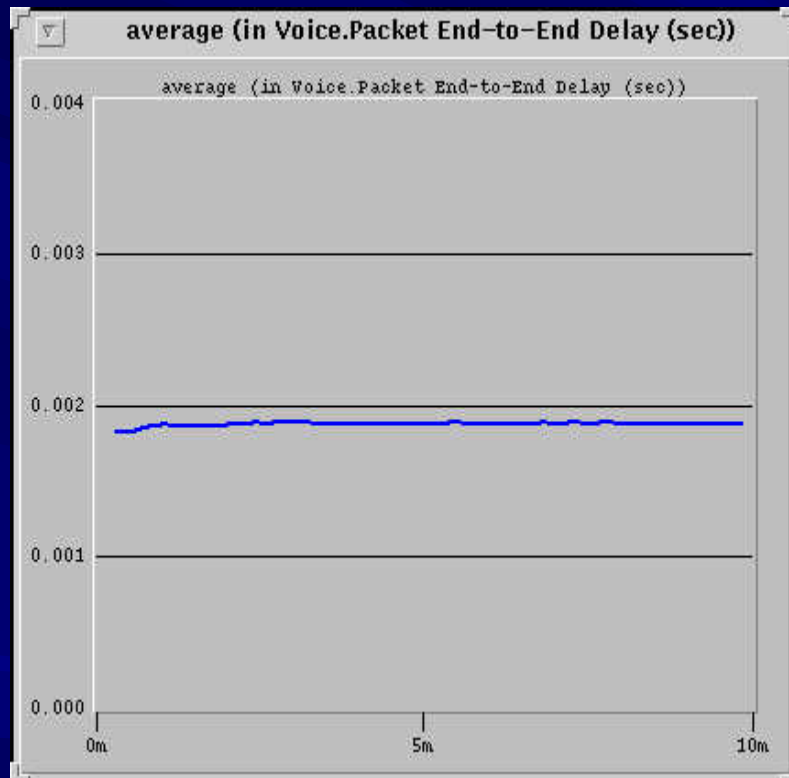
Wireless LAN workstation

UAC PROCESS MODEL

UAS PROCESS MODEL

Simulation Results & Performance Evaluation

Result Evaluation & Conclusion

❖ We will evaluate if the delay introduce by handoff procedure is endurable for voice traffic.

❖ Give our conclusion whether SIP can be used as a mobility support method over wireless links for real-time traffic.

Future Work

❖ Integrate Registration procedure into Handoff process

❖ Simulate the Handoff procedure under the reDirect Mode

References

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❖ [2] Banerjee N., Basu K., Das S.K., "Hand-off delay analysis in sip-based mobility management in wireless networks", Parallel and Distributed Processing Symposium, 2003. Proceedings. International , April 22-26, 2003. Handoff Delay Analysis in SIP Based Mobility Management in Wireless Networks.pdf

❖ [3] IEEE, "802.11 Wireless LAN Medium Access Control(MAC) and Physical Layer (PHY) specifications," approved 26 June 1997. IEEE Std 802.11-1997-Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) specifications.pdf

❖ [4] M. Handley, H. Schulzrinne, E. Schooler, and J. Rosenberg, "SIP: Session Initiation Protocol", RFC 2543, Internet Engineering Task Force, March 1999., SIP: Session Initial Protocol

❖ [5] OPNET documentation: "Wireless LAN Model Description", MD-36-1 to MD-36-16,Release 9.1 OPNET Documentation: Description of Wireless LAN Models

❖ [6] Dorgham Sisalem, Jiri Kuthan, "Understanding SIP",