PlanetLab의 모바일 확장 경험 및 향후 계획

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FIF Winter Camp

Introduction

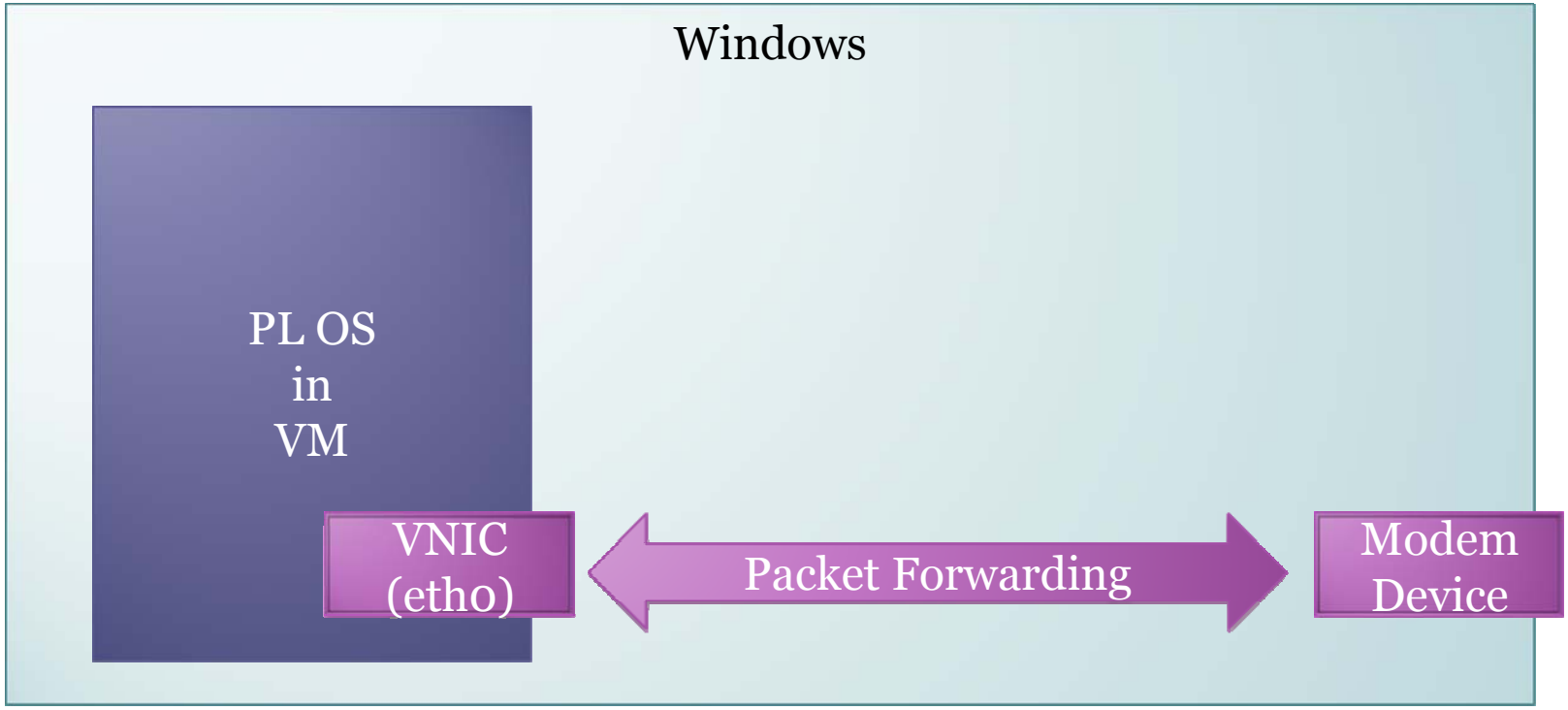
- Building PlanetLab node that is running over wireless networks
  - **Manage** PlanetLab nodes over wireless
  - **Connect to** PlanetLab nodes over wireless
  - Support multiple wireless interfaces to share a node among many users

Technical Challenges

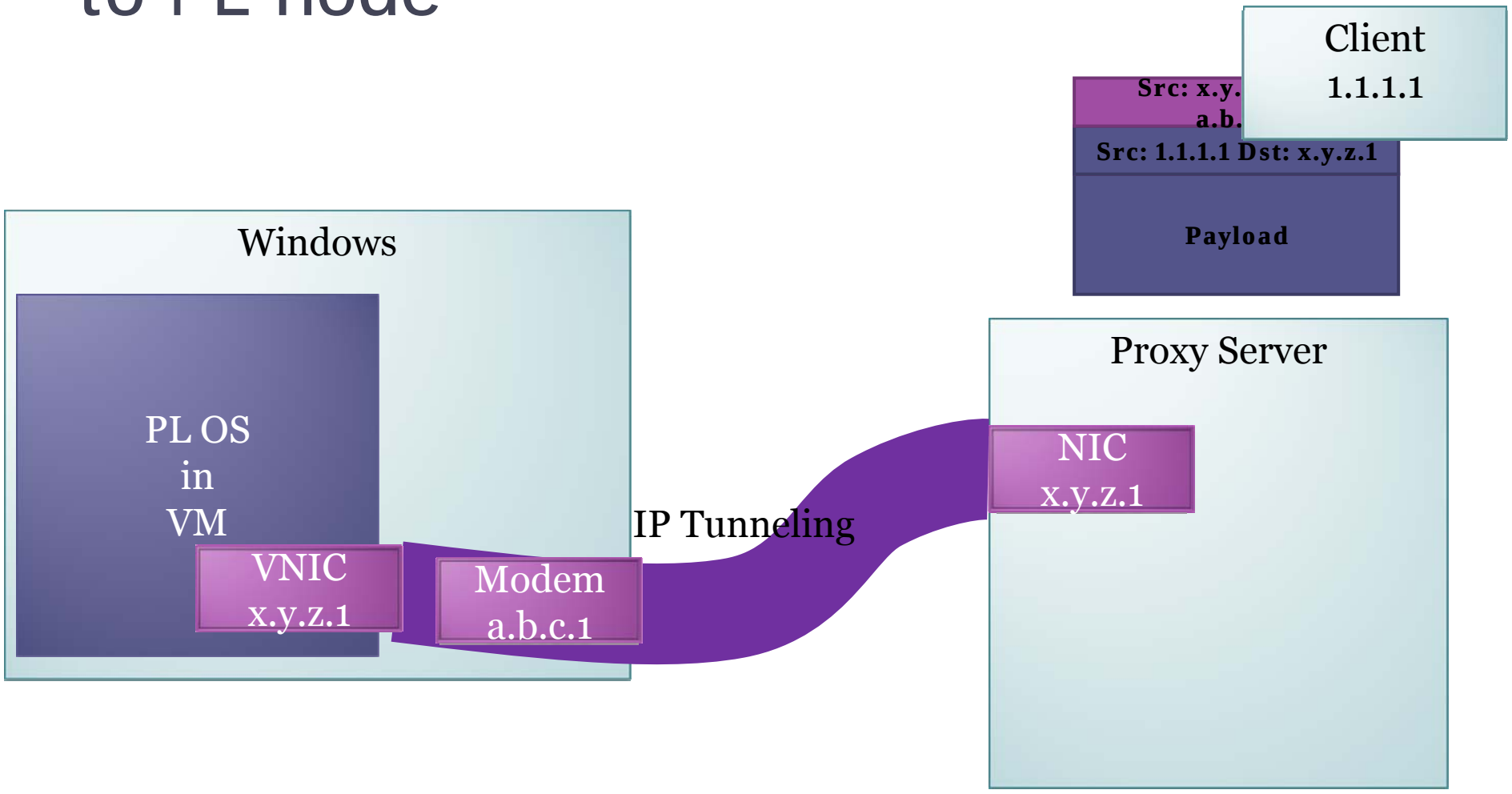
- PlanetLab does not support non-Ethernet interfaces as its main interface
  - WiBro modems work as Ethernet devices but no support for Linux yet
  - HSDPA/CDMA modems work as serial modem
- PlanetLab requires static and public IP address
  - Mobile ISPs do not allocate static IP address to modems
  - ISPs even allocate private address for modems

Running PL with non-Ethernet Interfaces

- Running PlanetLab inside a Virtual Machine



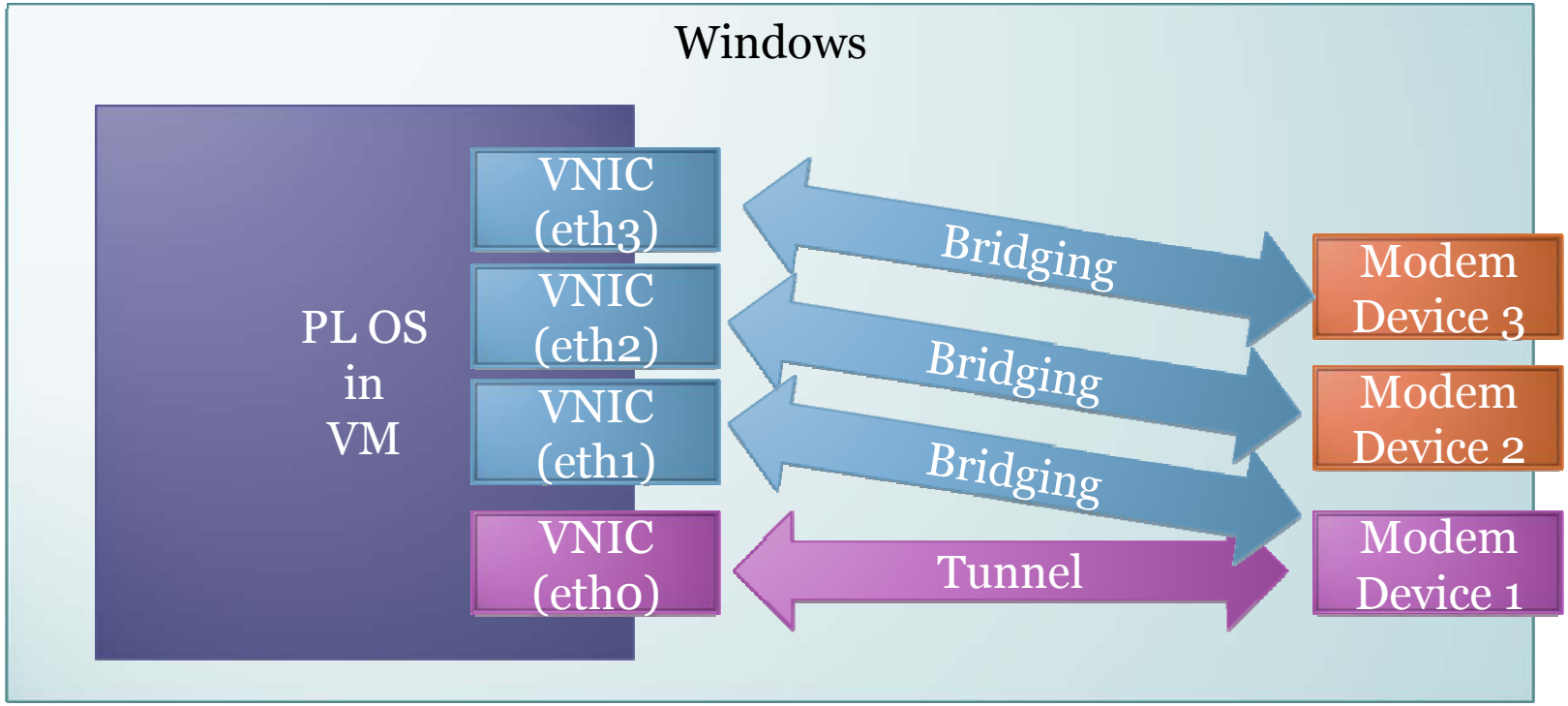
Assigning static and public IP address to PL node



Challenges with supporting Experiment with Wireless Modems

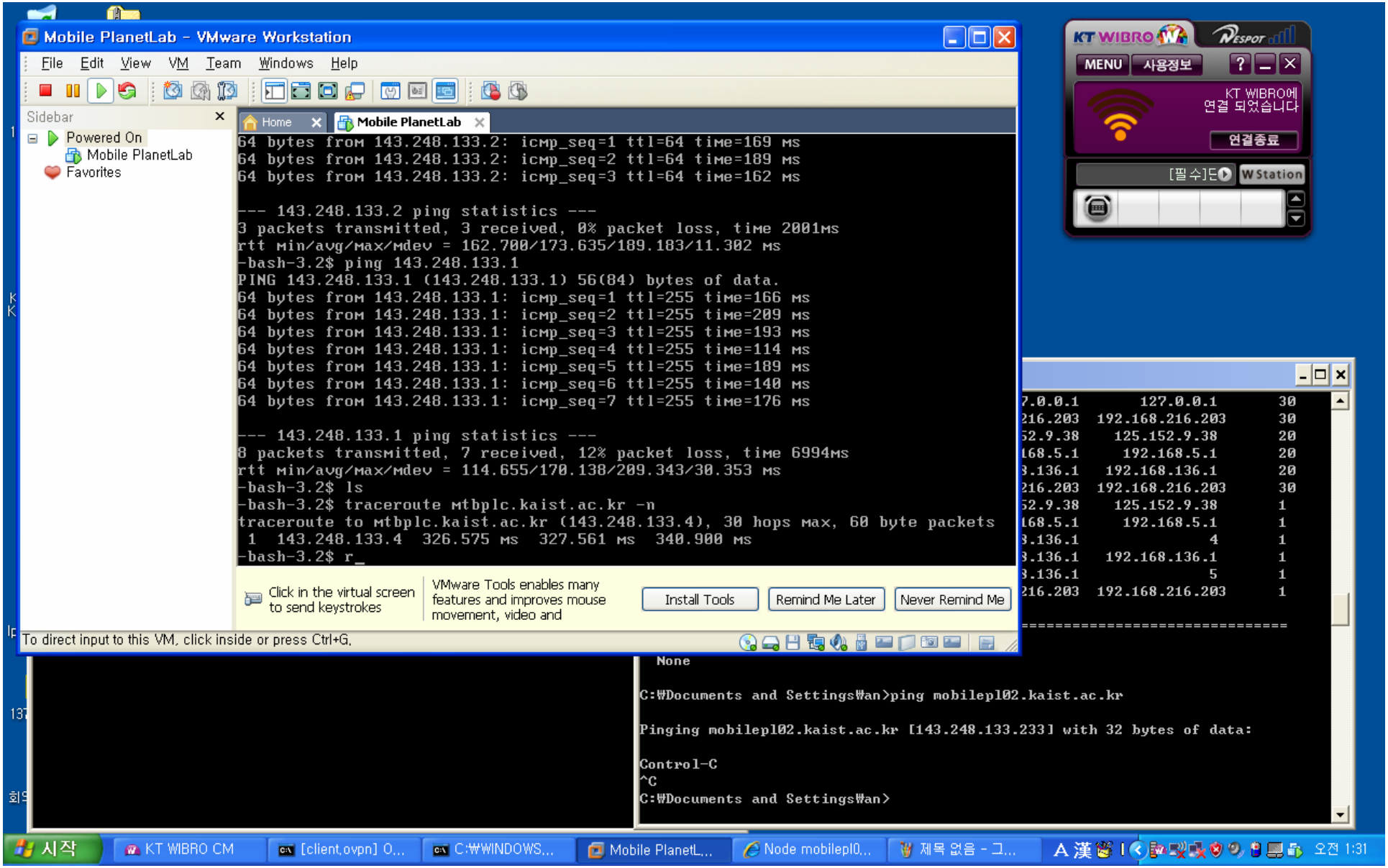
- Tunneling traffic changes wireless link characteristics
  - Decreased MTU size due to encapsulation
  - Detour through proxy server
- Many wireless experiment requires dedicated access to modems

Architecture for Enabling Experiement with Wireless Modems



Status Quo

- PL node successfully runs over HSDPA and WiBro interfaces without any modification


Mobile PlanetLab - VMware Workstation
File Edit View VM Team Windows Help
Sidebar
Powered On
Mobile PlanetLab
Favorites
Home
Mobile PlanetLab
64 bytes from 143.248.133.2: icmp_seq=1 ttl=64 time=169 ms
64 bytes from 143.248.133.2: icmp_seq=2 ttl=64 time=189 ms
64 bytes from 143.248.133.2: icmp_seq=3 ttl=64 time=162 ms
--- 143.248.133.2 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2001ms
rtt min/avg/max/mdev = 162.700/173.635/189.183/11.302 ms
-bash-3.2$ ping 143.248.133.1
PING 143.248.133.1 (143.248.133.1) 56(84) bytes of data.
64 bytes from 143.248.133.1: icmp_seq=1 ttl=255 time=166 ms
64 bytes from 143.248.133.1: icmp_seq=2 ttl=255 time=209 ms
64 bytes from 143.248.133.1: icmp_seq=3 ttl=255 time=193 ms
64 bytes from 143.248.133.1: icmp_seq=4 ttl=255 time=114 ms
64 bytes from 143.248.133.1: icmp_seq=5 ttl=255 time=189 ms
64 bytes from 143.248.133.1: icmp_seq=6 ttl=255 time=140 ms
64 bytes from 143.248.133.1: icmp_seq=7 ttl=255 time=176 ms
--- 143.248.133.1 ping statistics ---
8 packets transmitted, 7 received, 12% packet loss, time 6994ms
rtt min/avg/max/mdev = 114.655/170.138/209.343/30.353 ms
-bash-3.2$ ls
-bash-3.2$ traceroute mtbplc.kaist.ac.kr -n
traceroute to mtbplc.kaist.ac.kr (143.248.133.4), 30 hops max, 60 byte packets
1 143.248.133.4 326.575 ms 327.561 ms 340.900 ms
-bash-3.2$ r_
Click in the virtual screen to send keystrokes
VMware Tools enables many features and improves mouse movement, video and
Install Tools
Remind Me Later
Never Remind Me
To direct input to this VM, click inside or press Ctrl+G.
KT WIBRO
MENU
사용정보
KT WIBRO에 연결 되었습니다
연결종료
W Station
None
C:₩Documents and Settings₩an>ping mobilepl02.kaist.ac.kr
Pinging mobilepl02.kaist.ac.kr [143.248.133.233] with 32 bytes of data:
Control-C
^C
C:₩Documents and Settings₩an>
시작
KT WIBRO CM
[client,ovpn] O...
C:₩WINDOWS...
Mobile PlanetL...
Node mobilepl0...
제목 없음 - 그...
오전 1:31

Lessons learned

- Wireless link is not very stable
  - Disconnected irregularly couple of hours after connection establishment
- Link speed is very slow
  - It took 6 hours for initialization of a PL node over CDMA
- PL in VMWare in Windows is hard to automate
  - Automating installation of Windows, VMWare, PL OS…

Future Work

- Wireless links aggregation
  - Aggregate available bandwidth
  - Provide a reliable management channel
- User interface for sharing multiple wireless interfaces
  - Reservation of modem for dedicated access
- Integrating into PlanetLab codes

Q&A