The technical and business challenges in wide deployment of WLAN Hotspot Networks

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Reference

P. Bahl, A. Balachandran et. al, “PAWNs: Satisfying the Need for Ubiquitous Secure Connectivity and Location Services,” IEEE Wireless Communications, Vol. 9, no. 1 (February 2002)
Hardware Growth & Costs

- Analysts project 48 million 802.11-enabled Laptops and PDAs by 2007
- Gartner forecasts over 16 million access points and over 100 million LAN adapters worldwide by 2005
- Prices for access points and adaptors continue to fall, with more than 50 vendors shipping equipment
  - Enterprise APs dropped from $1000 to $375 with a 20x volume increase in 2001
  - Retail adaptor prices went from $250 to $50
  - BOM has dropped below $5 for .11b chip sets
- Growth of WiFi Phones
WiFi phones?

- Motorola announced a Wi-Fi phone for VoIP (early 04)

- **Nokia**
  - D211 GPRS/Wi-Fi PC Card available now
  - GPRS/Wi-Fi phone beta in late 2003

- Qualcomm MSM7000 chip with integrated ARM CPU, CDMA, and Wi-Fi (early 04)

- HP & Dell have announced integrated phone/Wi-Fi PPCs in 04
Wi-Fi Landscape

Major Operators:
- T-Mobile
- TeliaSonera
- AT&T Wireless
- Verizon Wireless

Emerging National (U.S.) Operators:
- Wayport
- Cometa

Other emerging Branded Service Providers:
- Earthlink
- AOL

Aggregators:
- GRIC
- IPass
- Boingo
- rovingIP.net

Hot Spot Operators:
- Azure Networks
- Sip’n’Surf
- Air-2-Lan
- FatPort
- Broadreach Networks
- Broadband Express
- Pronto Networks
Wi-Fi Landscape: Addl. Stake Holders

IBM & Accenture
- Backend services

Intel, TI, AMD
- WiFi chips and mobile services

Cisco
- IOS on WiFi networking

Toshiba, Apple
- Experience

HP
- Hardware
Reality in Pictures
What do I know about this subject..

The Choice Network (Jan. 1999 – Nov. 2001)
- First Public Area WiFi Network (PAWN)
- Deployed in Crossroads Shopping Center, Bellevue, Washington, USA

Features
- Intranet and Internet access
- Global authentication
- Privacy for users and security for operators
- Differentiated services based on policies
- Location based services
- Roaming support between multiple networks
- Packet level accounting
- Ease of deployment
Broadband wireless Internet connectivity & location services in public places:  http://www.mschoice.com

Eat, Drink and Be Connected

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The CHOICE Network

Version: Beta 1
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CROWN
Crossroads
Wireless Network

Sign up now!

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Business Models

WISP Start-ups

Cellular Operators buy out / Invest in WISPs
- Wi-Fi fills in 3G gaps and provides higher speed
  ➔ T-Mobile runs the hotspots in Starbucks
  ➔ Sprint invested in Boingo

Organic Growth

The CHOICE Network
- Global authentication
- Individual Centric
- Cost and maintenance of equipment & services by local entity
- Tuned services: e.g. context and location aware
PAWN Customers

Initial target - Individuals
- Not very successful
- Chicken and egg problem, not enough hot-spots, subscriber fee is high, few takers

Evolving towards Businesses
- Rethinking, go after the mobile workforce

Here’s the justification........
Mobile Workforce

2005 Estimate: 4.5 million users out of 16 million mobile workers will use PAWNs

In 2005 82% of all business laptops will include WiFi versus 37% of Consumer laptops

Hope: The mobile workforce will drive a need for increasingly greater hot spot deployment

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What about Subscriber Cost?

**Hope:** Pressure from competition will continue to drive down pricing over time while also fueling hot spot buildout

**Want:** Pricing needs to get below $25/month
PAWN Market

<table>
<thead>
<tr>
<th>Year</th>
<th>Consumer (000s)</th>
<th>Business (000s)</th>
<th>Total Retail US PWLAN Subscribers (000s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>354</td>
<td>224</td>
<td>578</td>
</tr>
<tr>
<td>2003</td>
<td>60</td>
<td>776</td>
<td>836</td>
</tr>
<tr>
<td>2004</td>
<td>215</td>
<td>1,705</td>
<td>1,920</td>
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<tr>
<td>2005</td>
<td>845</td>
<td>2,947</td>
<td>3,792</td>
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<tr>
<td>2006</td>
<td>1,604</td>
<td>4,690</td>
<td>6,394</td>
</tr>
<tr>
<td>2007</td>
<td>2,506</td>
<td>5,960</td>
<td>8,466</td>
</tr>
</tbody>
</table>

5 Year CAGR: 92%

~9 million subscribers paying $25 / month results in a $2.7 billion services market by 2007.
So, what am I we saying ...
The CHOICE model is good

Small hotspot operators (WISPs) have tried & failed
- e.g. Mobilestar bankruptcy

Large Telcos can’t cover it all (not growing fast enough)
- Ignore small businesses (malls, restaurants, museums etc.)
- Impacting the mobile workforce alone is not enough
- Benefits of hardware cost reduction not passed on to user

Win-Win for all: Organic Growth (CHOICE)
- Targets the individual
- Small businesses become hot-spots (greater overall coverage)
- All stakeholders benefit
- Easy to incorporate location services
Thanks!

Details in:

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