The Mobile Internet

If it’s not wireless, it’s got too many strings attached.

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Overview

- The Wireless Internet Market
- The Wireless Internet as it exists today
- WAP – Wireless Application Protocol
- Wireless Applications
- The Future of the Wireless Internet

The Wireless Internet Market

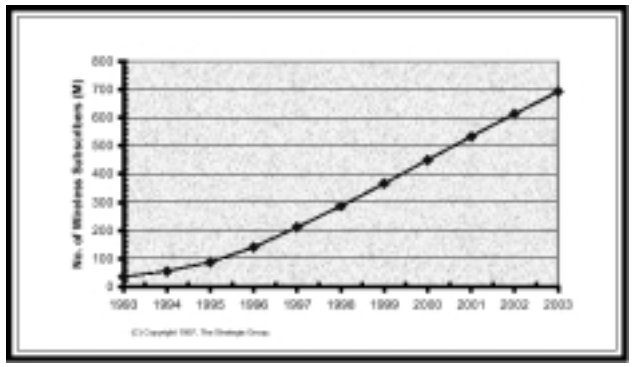
- Over 2 million subscribers using cellular or PCS devices to access Internet or e-mail
- US wireless data market will expand to 12.5M users by 2002. (Yankee Group)
- 529 million wireless subscribers by 2002 (Yankee Group)
- Yankee Group: 1 billion mobile phones by 2003, hundreds of millions data enabled.
- Nokia as of Mar 2000: 1 Billion mobile phones by 2002.

The Wireless Internet Market

- Every major handset manufacturer: all phones will include wireless data capability by 4Q 2000
- 525 million WAP handsets expected to ship in the US and Western Europe between 1999 and 2003 (Strategy Analytics)
- In 2005, Americans are expected to spend nearly $60B for wireless services, $8.4B of it on data. (Forrester)

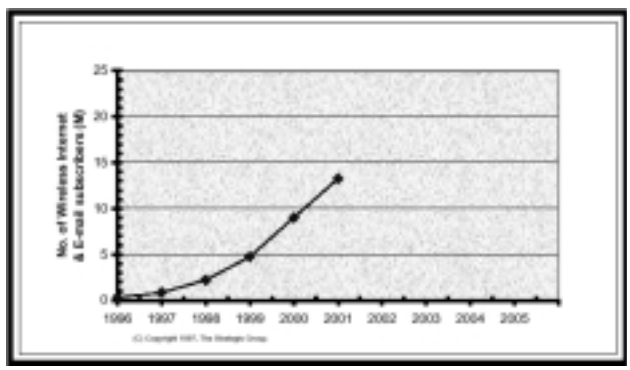
Market Statistics

Subscriber Adoption Rate

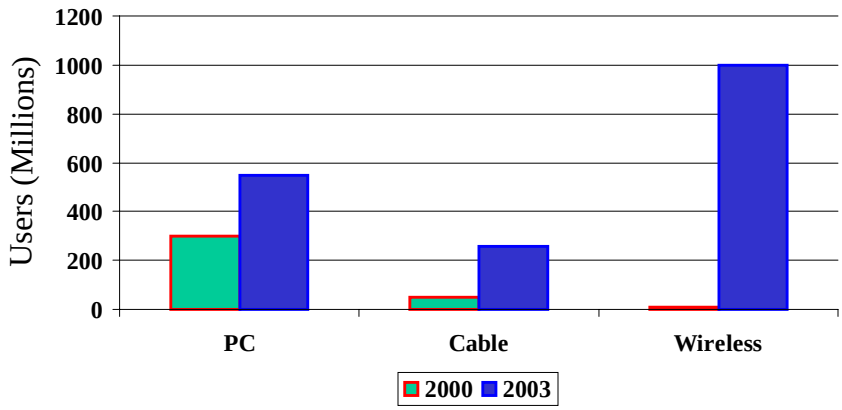


Market Statistics

Subscribers with Internet Access

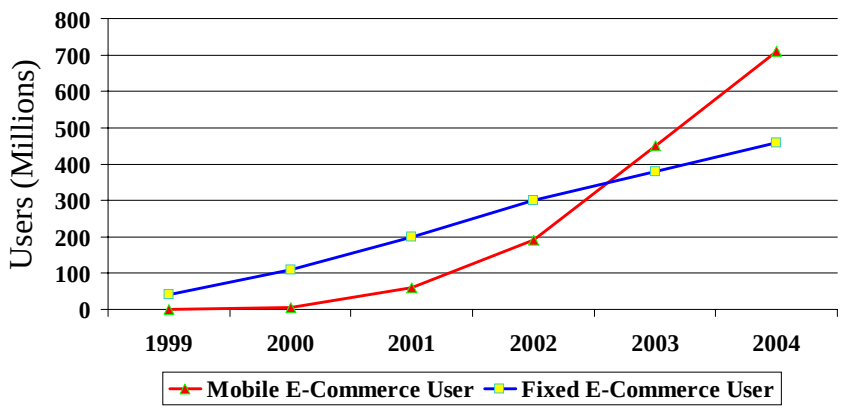


Internet Connections



Source: ARC Group

Worldwide E-Commerce Users Prediction



Source: ARC Group

More predictions from Industry Analysts

- By 2003, there will be more mobile internet connections than PC-based connections
- By 2004 15% of all network service spending of enterprises will be on wireless voice and data solutions
- Through 2004, enterprises that do not correctly identify mobile users' needs will decrease knowledge workers productivity by at least 20%
- By 2001, for mission-critical wireless uses, quality will overtake price as the key buying criteria

The Wireless Internet As It Exists Today

- Forms of Wireless Internet
  - Remote PC access
    - Wireless data access to the Internet via
      - Mobile phone data link
      - Wireless network connection
    - Pros
      - Full Internet functionality
    - Cons
      - Still requires a laptop PC (bulky)
      - Time-consuming
      - Unreliable connections
      - Difficult reconnection
      - Slow connection speeds
      - Costly connections

The Wireless Internet As It Exists Today

- PDAs (Personal Digital Assistants)
  - Pros
    - Larger display size
    - Web site access (browsing)
    - Web and WAP
  - Cons
    - Separate device for data access
    - Data only (no voice)
    - Slow connection speeds
    - Data speeds will not advance rapidly
    - Geographic restrictions

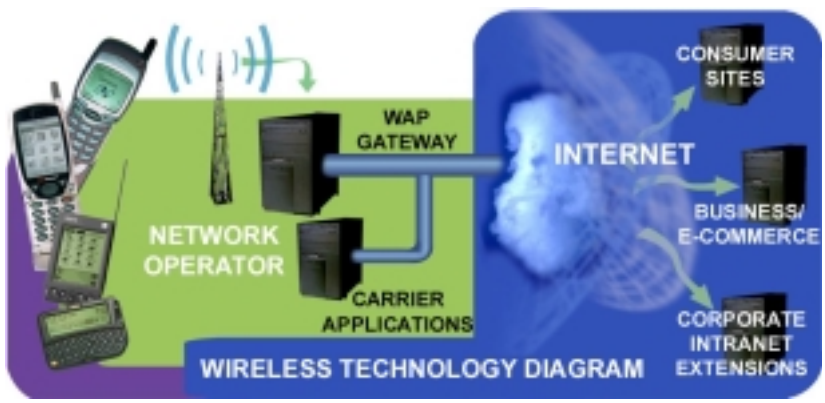
The Wireless Internet As It Exists Today

- Mobile Phones
  - Pros
    - One device
    - Easy connection
    - Roaming data services
    - Simplified service oriented sites
    - Faster speeds
    - Convergence with PDAs
  - Cons
    - Specialized WAP sites need to be constructed
    - No Web
    - Multiple standards (today)
    - Limited displays (size and color)
    - Limited keypad functionality

The Wireless Internet As It Exists Today

- Bandwidth
  - Increasing in stages
    - 14.4Kbs – current technology
      - Text with very limited monochrome graphics
    - 64Kbs – GPRS / EDGE
      - by 2002
      - Text with graphics
    - 384Kbs – 3G
      - By 2005
      - Text, graphics, and streaming video

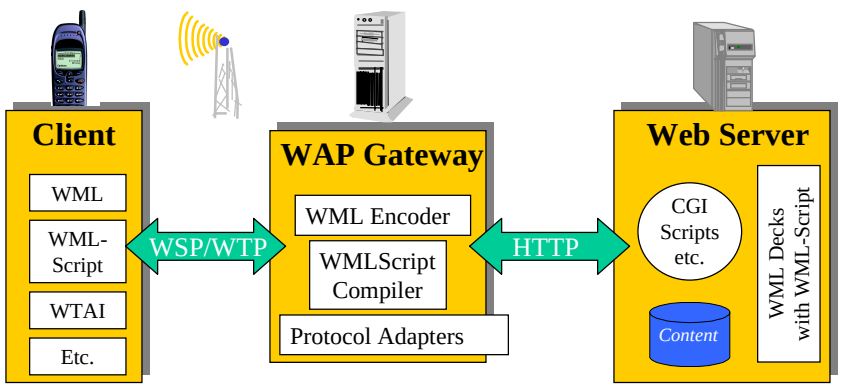
Technology Overview



How does the Wireless Internet Work?

- Microbrowser – Specialized browsers in the phone
  - Supports special markup language (WML / HDML)
  - Limited graphics capability
  - URL formatted requests
- Data communication over the cellular network
- WAP Gateway – special server that routes cellular data requests to the Internet
- Web Servers – receive URL requests and send wireless content back
- Security – a combination of wireless and SSL

WAP Architecture



Why not use the Web for the Wireless Internet?

- Device constraints
  - Small display
  - Limited / no graphics
  - No color
  - No mouse (to select hyperlinks)
  - Limited keypad
- Connection speed restrictions = 14.4Kbs
- Protocols too heavy
  - Comparing 3 requests and 3 responses
    - Web – HTTP / TCP / IP : 17 packets, 65% protocol overhead
    - Wireless – WSP / WTP / UDP : 7 packets, 14% overhead

Why not use the Web for the Wireless Internet?

- Average usage for data-driven content (in packets)
  - Standard Web Pages (with graphics) = ~180
  - Text-only Web Pages = ~40
  - WML = ~5

The WAP Forum

- The governing body responsible for defining and evolving the Wireless Application Protocol standards
- Formed by Phone.com, Nokia, Ericsson, and Motorola
- Membership includes over 400 companies
- Working with W3C to converge with the Web standards

Application Examples

- Consumer Apps
  - Weather
  - News headlines
  - Cinema listings
  - Restaurant guides
  - Travel Information
  - Telephone directories
  - Sports Info
  - Lottery results
  - Personal Organization
- m-Commerce Apps
  - Wireless Banking
  - Wireless shopping
  - Airline reservations
  - Ticketmaster
- Business to Employee
  - Sales Force Automation
  - Dispatch
  - Intranet extensions

Case study: Retail Banking

Scroll through menu:

Select *Services*
Select *Bookmarks*
Select *Banking*

Authentication

Banking options:

Checking Summary, Savings Summary, Money Transfer, Customer Service

Select *Money Transfer*

Enter:

Amount of money to transfer
Account number that money is coming from
Account number that money is going to

Select *Transfer*

Confirmation Message appears

How Do You Build Wireless Applications

- What do you need?
  - Web Server
  - Select your preferred Web Application Environment (Java, JSP, ASP, PERL, etc.)
  - Microbrowser Simulator
    - Phone.com, Nokia, Ericsson, etc.
  - Editor
  - Documentation

How Do You Build Wireless Applications

- Construction Process
  - Define high-level application functionality and database specifications
  - Define and Map the flow of your application in terms of Decks, Cards, and Links.
  - Define the server functionality / modules
  - Define the phone variable / parameter mapping
  - Create the WML / HDML content
  - Create the server-side modules that drive the content
  - Test in simulator during construction
  - Test final application in a variety of phones for compatibility

How Do You Build Wireless Applications

- Things to consider
  - Geographical scope
    - WML, HDML, both
    - Multi-lingual interface?
  - Special Wireless Functionality
    - Subscriber ID
    - Location-based Services
    - Notification Alerts

Tools and Technologies

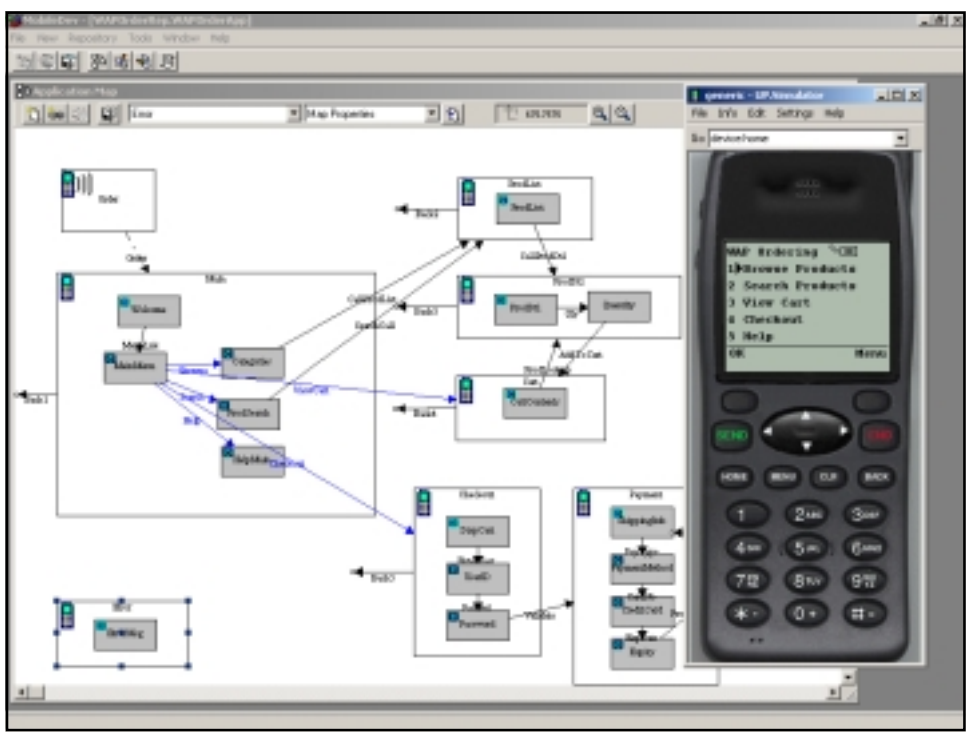
- Software Development Kits
  - Contains simulator, documentation, and code examples
  - Available from Phone.com, Nokia, Ericsson
  - No real tools
- Wireless Application Development Tools
  - MobileDev – Worlds first and only (at time of print)

MobileDev

- The first development tool for building WAP applications
- Fully supports WAP standards
- Supports both HDML and WML interfaces
- Designed for the novice developer, but open enough for experts
  - Wizard-rich
  - Automatic application generation, compilation, and deployment

MobileDev

- Support for multiple run-time engines
  - MobileDev Server Script
  - Java
  - Microsoft ASP
  - PERL
- Wizards to create back-end code for special wireless features
  - Subscriber ID, Notification Alerts, Location-based Services



The Future of the Wireless Internet

- A convergence between PDAs and Phones
- WAP superceded in 3-4 years
  - Devices get stronger (functionally and graphically)
  - Bandwidth increases
- Bluetooth facilitates short range, high speed wireless communication

And this is just the beginning...