

# Mobile Communications and Computing Devices: Trends and Technologies

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## A Little About Me...

- Principal, Farpoint Group
  - Since 1991
  - Advisory service for wireless networking and mobile computing
- Member, IEEE
- Program Chair, Interop Mobile Business Conf.
- Columnist, [informationweek.com](http://informationweek.com) and [searchmobilecomputing.com](http://searchmobilecomputing.com)
- Blog: [networkworld.com/community/mathias](http://networkworld.com/community/mathias)
- Engineer (OK, applied math/computer science)
- *Analyst* - in the business of predicting the future
  - Conclusions aren't important, but the reasoning behind them *is!*
  - *You've got to show your work...*



## Our Topics for Today...

- A brief trip down memory lane
- The mobility challenge – why it remains
- The content value chain
- The single-device paradox
- The rise of infocentricity
  - Re-defining the subscriber unit – *and mobility itself*
- A few remaining issues
- A few (interim) conclusions



## GRiD Systems *Compass* *Computer Model 1101 (1982)*

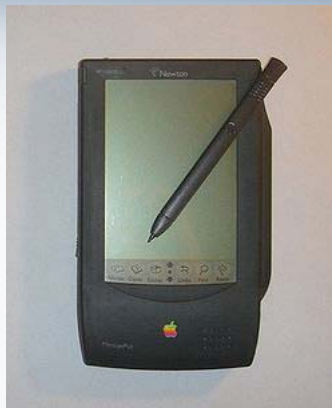


## *Osborne 1 (1981) and Compaq Portable PC (1983)*



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## *Apple Newton MessagePad (1993)*



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## *Palm Pilot 1000 (1996)*



## *EO Communicator 440/880 (1993)*



## Motorola *Envoy* (1994) and *Marco* (1995)



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## Motorola *StarTAC* (1996)



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## IBM *Simon* (1993)



## Handspring *VisorPhone* (2001)



## Nokia N-Gage (2003)



## Samsung sph-n270 (2003)



## Key Assumptions

- Business remains dependent on *anytime, anywhere* access to information
  - The last good competitive differentiator
  - No longer that different for consumers...
- *Ease-of-use* is a key requirement and product differentiator
  - It's all about *convenience*
- What we want
  - A *uniform experience* no matter where we go and no matter what devices we have at hand
    - It's all about *productivity* – and therefore *time*
    - However, we can't carry everything we need (e.g. printers – *and more!*)
  - *Mobility* – location-independent access to information and IT
  - *The Webification of everything* (e.g., Google Apps/Wave)



## Mobility Remains a Challenge



Work

Humans are naturally and historically mobile



Play



(And if you break the rules...)

Information technology solutions have evolved to fit this requirement

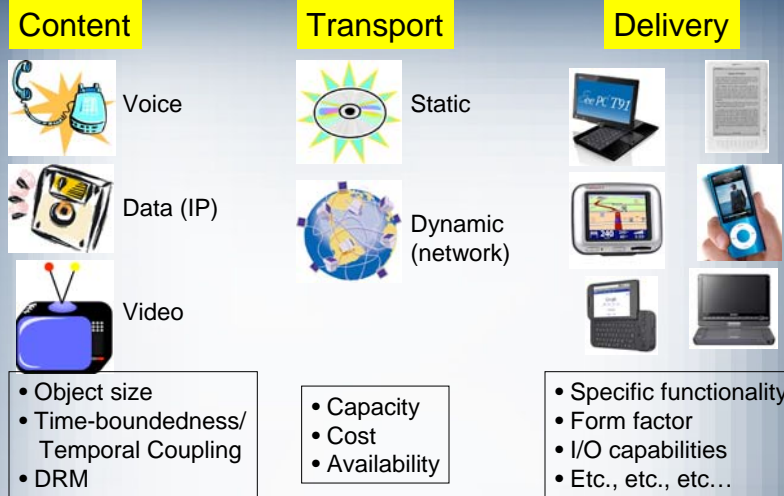



But a mismatch between objectives and solutions often leads to disappointment, irritation, loss of productivity, ...

Source: Farpoint Group



# A Strategic Model of the Media Value Chain



Source: Farpoint Group 

## The Single-Device Imperative – and Paradox

- Wireless network services are converging – all IP, just like wire
  - But devices (subscriber units) are *diverging* – and will continue to do so
- Nonetheless – *we want it all, and we want it all in one device*
  - The *single-device imperative*
  - But this is *impossible* – too many conflicting goals
    - Size, weight, price, operating system/environment, user interface, battery life, ...
  - Which results in the *single-device paradox*
- No single handset design will win
  - Continuing innovation is essential to sales
  - But expect flip, slide/candy-bar, and PDA styles to dominate
  - Increasing role for Linux
- Thin clients are becoming more important – and more feasible
  - Local or Web/cloud execution?
  - *Mobile device management* extends to edge of mobile network



# The Single-Device Paradox

Diversity, not Convergence



Samsung Omnia



Samsung Saga

- ◆ Styling
  - ◆ Size
  - ◆ Weight
  - ◆ Battery life
  - ◆ Ruggedness
  - ◆ Cost
  - ◆ Other functionality (cameras, mp3, GPS, ...)
  - ◆ Etc.
- ◆ Operating environment/API
  - ◆ User Interface
  - ◆ Application software (including browser)
  - ◆ Etc.



BlackBerry Bold



BlackBerry Storm

Source: Farpoint Group



# Mobile Devices: Key Options



Replace/Mobilize the Desktop



Augment the Desktop



Redefine/Virtualize the Desktop – Netbooks, cloud/Web services, and virtualizing everything!



# Styling is (almost) Everything



Verizon Droid



HTC Touch Diamond



BlackBerry 8830



T-Mobile Sidekick Slide



Palm Prē

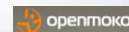
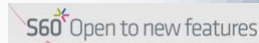
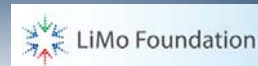


Apple iPhone

But: screen and keyboard are *fundamental* limitations



# Platforms: Choices, Choices, Choices...



## A Few (and very new...) More



Motorola *Cliq*  
(Android)



Palm *Pixi*  
(WebOS)



RIM *BlackBerry Storm 2*  
(BlackBerry OS)



Verizon *HTC Imagio*  
(Windows Mobile 6.5)



## Web Services: Microbrowser No More



Bitstream *Thunderhawk* Browser



*Opera Mobile* Browser



*Skyfire* Browser



Apple *iPhone* (Safari)

But...

- Fundamental limitations in screen size
- Many local apps are really just front-ends for Web services
- Conflicts in APIs remain



# The Carry-IT-All-With-You Model is Fundamentally Broken

- Too big
- Too many units and parts
- Too heavy
- Unreliable
- Obsolescence
- Capital costs
- Operating costs
  - Training
  - Support
  - Backup
- Data in the wrong place
  - Synchronization
- Limited battery life
- Requires a network *regardless*



Source: Farpoint Group



# The Era of Infocentricity – The Increasing Value of *Information*

1960s/70s  
*Compu-Centric*



- *Computers* matter
- *Custom* applications

1980s/90s  
*Application-Centric*



- *Applications* matter
- *Standard* applications

2000+  
*Info-Centric*



- *Information* matters
- Browsers matter
- Universal clients?
- Anytime/anywhere access
- Cloud/Web computing
- Continuous connectivity

Source: Farpoint Group



# The Subscriber Unit of the Future



or even...



# Best Mobile Tool for the Job: Guest Hospitality IT

Check In



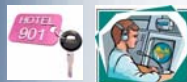
Lighting and Environmental



Entertainment



Security



Convenience



Communications



Information



User profile Mash-up

Business Center



Meeting Rooms



Remote Access - Home



Remote Access - Work



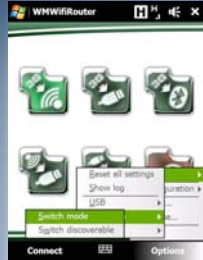
Check Out



Source: Farpoint Group



# The Relay-Point Model and MUC



WMWiFiRouter



Novatel Wireless MiFi



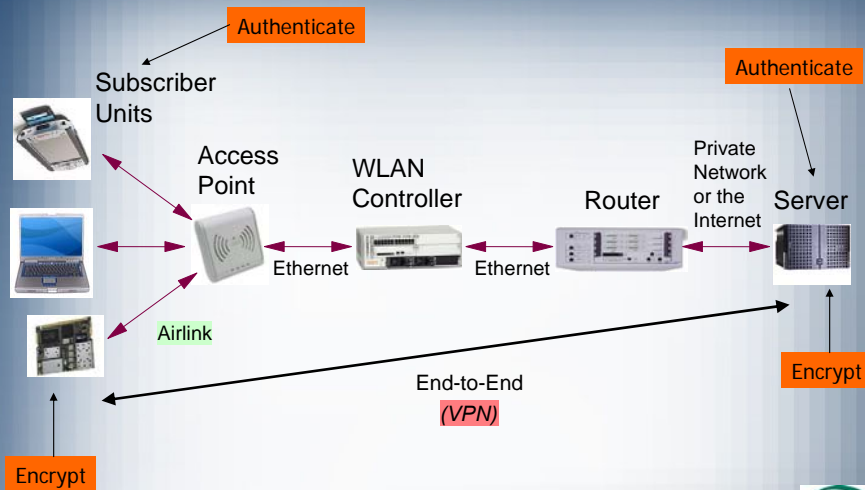
levelone WBR-3800 portable hotspot



DiVitas Mobile Unified Communications



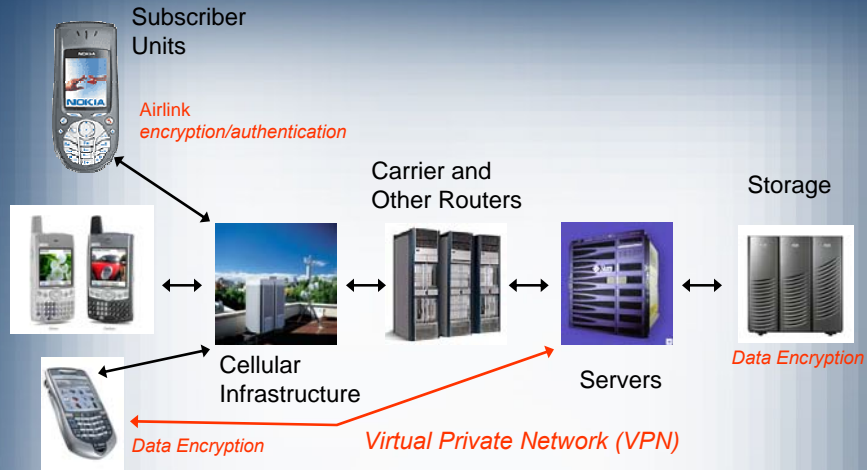
# The WLAN Security Value Chain



Source: Farpoint Group



# The WWAN Security Value Chain



Source: Farpoint Group



# Mobile Device Management

- Minimize OpEx
- Carrier or enterprise?
- Standards (e.g., OMA)



Provisioning and Updates

Configuration Management



Deactivation/Zapping

Cost Accounting and Management



Security and Integrity

Help and Troubleshooting



Backup/Restore

Policy Enforcement



Logging and Reporting

Source: Farpoint Group



## The Ultimate Limitation: Batteries and Power

- Two key issues
  - Supply-side – batteries and power management
  - Demand-side – better process technologies (chips – e.g., Intel Atom), architectures, designs and implementations, power-saving protocols
- Do not expect exotic solutions, like fuel cells
  - They're possibly OK as secondary batteries, but not as primary cells
- Clever supply-side technologies hold the near-term key
  - Improved lithium cells
  - Supercapacitors
- Don't expect "wireless power" anytime soon...
  - "Wireless" rechargers may make sense, though



## Openness 2.0

- Networking has been built on a foundation of openness
  - IP, ISO/OSI Model, standards
- Vendors hate openness for obvious reasons
  - And bundling of handsets with service needs to end, too...
  - And don't get me started on app stores...
- Nonetheless:
  - *Open Access* – use any authorized compatible device
    - FCC will shortly issue ruling
  - *Network Neutrality* – any application
  - Number portability
- Traffic prioritization (at higher cost) will be the differentiator
  - Unlimited service, unlimited prioritization



## The Next Frontier: Sociology

Manners



Safety

Source: Farpoint Group



## Cell Phones and Driving

- New England Journal of Medicine, 1997
  - Cell phone use while driving quadruples the risk of an accident
- Harvard Center for Risk Analysis, 2002
  - Cell phones responsible for 6% of US accidents
- David Strayer, University of Utah, 2003
  - Eye-tracker study
  - "Inattention blindness"
  - Hands-free devices don't help
- Unpublished NHTSA study, 2009
  - Hands-free devices don't help
- *Thus:* expect more *political* solutions in the future
- "Anytime/anywhere" should not be taken literally...
  - Whatever happened to common sense?



## Conclusions

- Bringing *everything* with you *everywhere* – mobilizing *life*
  - *Access, data, and control* – a new definition of *everything*
  - *But doing so in a device-independent fashion will be key*
    - Might even solve the power problem...
  - *Start with applications and data – not devices*
- *Device diversity continues – perhaps forever*
  - Great opportunity for industrial designers and software engineers
- The key to mobility today is in correcting the mismatches in the media value chain
  - Mobility is about *enabling*, not constraining, the user
  - The customer can't be owned – but they can be rented!
    - Standards must replace lock-ins – even the subtle ones, like app stores
  - The best tool for the job at the time
- Sociological impacts have yet to be addressed
  - Another great engineering opportunity



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