

A Survey on Wireless/Wireline Integration

**Prepared for:
WOCC**

Fuchun Joseph Lin 林甫俊

Chief Scientist

+1 732 699-2260

fjlin@research.telcordia.com

April 15, 2005

Outline

- Goal and Motivation of Wireless/Wireline Integration
- Landscape of Competition
- Wireless/Wireline Integration Effort in Mid1990s
- Wireless and Wireline Integration Effort Today
- A Survey of Operators' Efforts
- What May Happen Next

Goal of Wireless/Wireline Integration (or Fixed Mobile Convergence)

- The ultimate goal of this convergence is to deliver a seamless end user experience across multiple locations, multiple devices and multiple types of use.
- With the convergence between the mobile and fixed line networks, telecommunications operators can provide services to users irrespective of their location, access technology, and terminal.

Why Wireless/Wireline Integration?

- To create a new telecom services paradigm where instead of being network/device driven, this new paradigm involves the system being user/customer driven so that the customer is at the center of the network.
- To give the best of both the fixed and mobile worlds and provide user-centric services in terms of
 - the convenience and ubiquity of mobile services, and
 - the reliability, affordability and quality of fixed network services.

Business Players in Wireless/Wireline Integration

- **Service providers with both wireless and wireline assets** (Verizon, SBC, BellSouth and Sprint) may have an early advantage in the rush to integration.
- **Wireless- or wireline-only companies** (Qwest, AT&T, MCI, T-Mobile USA) can begin with resale of the other, but this may be not enough over the long term.
- **Cable companies** (Comcast, Time Warner, Cox, etc.) are just entering telephony and may need a wireless play to compete across-the-board.

A Summary of Competition among NA Operators (Source: RCBG)

North America	Wireless Voice	Broadband		VOIP Service	WiFi Hotspots
		HSD	DSL		
Cingular	core offering 1		w/ SBC	w/ SBC	w/ SBC
Verizon Wireless	core offering 1		w/ Verizon 3		w/ Verizon 2
Sprint Nextel	core offering		core offering	core offering	core offering
T-Mobile	core offering				core offering
Rogers	core offering	core offering			
SBC	w/ Cingular		core offering	launching	core offering 2
Verizon	w/ VZW 2		core offering 1	launching	core offering 2
Bellsouth	w/ Cingular 2		core offering 1		
Qwest	Sprint MVNO		core offering	core offering	
AT&T	Sprint MVNO			core offering	core offering
Comcast		core offering		core offering	w/ T-Mobile 3
Cox		core offering 1		core offering 2	
Time Warner	Sprint MVNO 3	core offering 1		core offering 2	
Cablevision		core offering		core offering	

Wireless/Wireline Integration Effort in Mid 1990s

- Make Wireline Voice Features (such as Call Waiting, Call Forwarding, Three Way Calling, Voice Mails, E-911, Number Portability) available to Wireless Subscribers
- Add Mobility to Wireline Services (such as Calling Card, Prepaid, Personal Toll Free Number)
- Merge Network Infrastructures such as Wireless and Wireline Intelligent Networks (WIN, CAMEL, AIN, and IN)

Wireless and Wireline Integration Effort Today

- Driven by the Vision of All IP Convergent Networks
 - One Core Architecture – Access-Independent IMS as the Core for various wireline and wireless access networks
 - One Service Experience – Single sign-on, single profile, single bill, and service portability (seamless user experience, consistent service) across multiple access networks and devices
 - One Device – Equipped with multiple interfaces for various wireline and wireless access networks

A Survey of Operators' Wireless/Wireline Integration Services (1)

- BellSouth/SBC: *FastForward*
 - Product Description: *FastForward* allows customers to conserve their wireless minutes on their primary Cingular phone while enjoying the clarity and quality of a wireline network.
 - Device Requirements: The *FastForward* device is a special wireless phone “cradle” that automatically forwards wireless calls to a preprogrammed landline home or work phone, while recharging the phone batteries.
 - Selling Point: Wireless calls forwarded with the *FastForward* device for a customer’s primary Cingular phone do not count against wireless minutes for customers who receive a combined bill for SBC/BellSouth local service and wireless service. This allows users to conserve their wireless minutes while enjoying the clarity and quality of the SBC/BellSouth wireline network.
 - Price: The device costs US\$40 and the service is free to SBC and BellSouth fixed line customers under various bundled arrangements, while standalone Cingular customers pay US\$3 per month.

A Survey of Operators' Wireless/Wireline Integration Services (2)

- SBC: *Unified Communications*
 - Product Description: *Unified Communications* integrates wireline and wireless voice messages, faxes and e-mail into a common mailbox, which is accessible anywhere that Internet access is available or via any phone.
- SBC: *Bundled Services* to increase availability and mobility of information
 - SBC FreedomLinkWi-Fi
 - SBC Yahoo! DSL
 - SBC PremierSERV Network-Based VPN
 - Cingular Wireless GSM Nation Plans
 - Cingular Data and Cingular BlackBerry Plans
 - SBC Connections Voice and Data Plans

A Survey of Operators' Wireless/Wireline Integration Services (3)

- **BT: *Project Bluephone***

- **Product Description:** To make fixed and mobile calls from the same handset. Bluephone handsets use a Bluetooth wireless access point, either at home or in the office, and from there connect onto the fixed-line network. If they move out of coverage range, they switch to Vodafone's GSM or 3G network.
- **Device Requirements:** Project Bluephone handset (by Motorola) with the new Class 1 Bluetooth chip (by Broadcom) providing coverage of more than 25 meters inside buildings and more than 60 meters in free air. If they move out of coverage range, they switch to Vodafone's GSM or 3G network.

A Survey of Operators' Wireless/Wireline Integration Services (4)

- BT:

- Due to the declining of wireline traffic, BT is moving to be a MVNO while positioning itself as the best provider of fixed transport to wireless SPs.
- BT already has agreements with O2 for business and T-Mobile for consumers. BT also works with Vodafone to push for its Bluephone Project.

A Survey of Operators' Wireless/Wireline Integration Services (5)

- KT: *One-Phone Service (“DU”)*
 - Product Description: DU is based on a CDMA2000 1x EV-DO portable handset operating on KTF's network, but it is Bluetooth-enabled and automatically switches calls from the mobile network to KT's local network whenever the subscriber comes within range of his or her landline's access device.
 - Motivation: In South Korea, mobile calls cost eight to ten times more than local fixed-line calls, and some estimate that the service might help subscribers cut more than 20% off their monthly mobile phone bills. That's great news for consumers and also for KT, which controls around 96% of the country's local call market. So all other telecoms companies in Korea are against One-Phone service.
 - Next Step: Support of switch between WLAN and cellular networks.
 - “KT’s approach is to keep increasing bandwidth availability for users so that it becomes an almost irrelevant factor and to push wireless access (via WiFi & WiBro) as part of the telecom infrastructure” – Sanghoon Lee, EVP of KT.

A Survey of Operators' Wireless/Wireline Integration Services (6)

- Sprint already has AT&T, Qwest Communications International and Virgin Mobile as its resale partners.
- Sprint is trialing a wireless/wireline integrated application called the ICN or “Integrated Campus Network”. In Sprint’s ICN solution, the company creates a private CDMA or WiFi network on a corporate campus by dedicating Sprint-licensed spectrum along with infrastructure to enhance in-building coverage and guarantee available coverage. Sprint’s secure end-to-end design includes VPN backhaul of all telecommunications traffic, and employs dual mode mobile phones that deliver seamless handoff between the WiFi wireless network and CDMA cellular network.
- Such a system benefits users by providing a single handset device for both “on-campus” and “off-campus” access, the ability to access the full list of PBX features while on either platform, a single voice mail system, and increased accessibility and productivity.
- Free PCS Calling to the home by Sprint LTD and Spring PCS

A Survey of Operators' Wireless/Wireline Integration Services (7)

- Verizon: *iobi service initiative*
 - Product Description: Through a Web interface, iobi lets customers manage phone calls, voice mail, calendars, address books, e-mail and more, using wireline and wireless phones, computers, laptops and PDAs. Besides voice, it can integrate on a single device (Verizon One Phone) all of users' communications, voice, email, messages and voicemails.
 - Verizon iobi includes real time call management, leaving the customers to decide where, how and if they receive calls and messages. This includes programmable call forwarding so calls can be directed users' telephone/ PC or their mobile. It also includes multi modal communications: regardless of how a message comes through, the customer can decide how to receive it, including by email, voicemail or SMS.
 - Motivation: Verizon announced this service 4 months after FastForward is offered by SBC/BellSouth/Cingular.

A Survey of Operators' Wireless/Wireline Integration Services (8)

- Verizon: *Verizon One*
 - Product Description: Verizon One looks like a top end cordless telephone, but there is much more to it. In addition to its touch screen computer, it has a built in DSL modem, which enables broadband access, and a WLAN router, which can connect all the PCs in a house wirelessly.
 - Combined with Verizon iobi, Verizon One can synchronize calls, emails, calendars and voicemails. The combination of iobi and One represents a strong convergent solution for residential customers and will build on the success of Verizon's 'Freedom' bundles of flat rate fixed, mobile and DSL services.

A Survey of Operators' Wireless/Wireline Integration Services (9)

- PCCW (Hong Kong):
 - *Next Generation Fixed Line Services (Fixed Line SMS and Personal Assistant)*
 - *Wireless Broadband Pay-TV Services*
- “All telecoms devices over the next ten years will have a wireless option, so PCCW is exploring how to fill the gap between broadband and mobility” - Wu Liang-Tai, EVP of Emerging Technology in PCCW

What May Happen Next

Phase 1: Price and Service Bundling

Phase 2: Ad-Hoc Integration

Phase 3: IMS Services

Lock in customer with convenience and discounts. No technical support

Price and service bundling 2003 ->

- Combined bills
- Satellite TV with Phone
- Cellular with Phone and DSL

Integrate separate networks to provide pre-IMS convergence

Ad-Hoc Integration 2005 ->

- TV caller ID
- WiFi-Cellular Roaming
- Follow-me; one-number
- Synchronized login / AAA

Target architecture. Ad-Hoc offers may be incremental stepping Stones to IMS

IMS Services 2007 ->

- Multi-media services
- Session Based services
- Many other new services



Backup

Challenges for Wireline Operators

- Percentage of households make LD calls using cellular phones is increasing (Yankee Group Nov. 2004) –
 - 35% 2002
 - 43% 2003
 - 60% 2004
- Percentage of households that have dumped their wireline services
 - 3.5% 2004
- Forrester Research claims that fixed operators are at risk of losing between 20%-25% of their revenues to mobile operators.
- According to Arthur D. Little, in 2003 Mobile operators have attracted only 34% of total traffic in the five major European countries. But Northstream expects future mobile networks to carry 80% of voice traffic within 4 years.
- The Yankee Group predicts the wireline displacement market could be worth as much as \$50 billion by 2006, with more than 40 percent of all wireline calls migrating to wireless services.
- According to TNS Telecoms, in the second quarter of 2004, 30 percent (the largest) of spending on telecommunications services was dedicated to wireless service while wireline service represented 29 percent of spending, a drop of 3 percent from the previous quarter. The average U.S. household spends \$47.87 on wireless service each month and a total of \$158.88 on all telecom services.

Benefits to Wireline Operators

- Mobility is considered an important feature by both the consumer and the business today.
- Wireline operators can increase the coverage of their services by offering wireless services.
- Wireline operators can leverage arbitrage by having mobile incoming calls diverted to the home wireline number when the mobile phone is cradled at home. (This brings calls back on to the fixed network. It offers a rare opportunity for fixed operators to not only slow down mobile substitution, but also generate incremental revenues.)
- Wireline LD operators can leverage broadband VoIP over WiFi at home or in office as the last mile (local loop) technology.

Challenges for Wireless Operators

- As cellular markets become saturated, adding new subscribers is no longer the growth engine of cellular revenues. Wireless operators must seek innovative ways to bring to life the future vision of always on personal communications today, as a means to increase usage.
- Cellular operators can use existing technologies to give subscribers a new reality today, of one number, one handset, always on. Leveraging Bluetooth technology that is already built into many of the mobile phones available today, and indoor installation of wireless access points can grace the cellular handset with superior indoor coverage.
- Percentage of mobile calls made within the office or home (where a fixed line is available)
 - 30%
- As cellular subscriber growth has reached its maturity stage, it is our belief that the increase in mobile operators traffic can only stem from increased indoor usage of the mobile phone. Using convergence over unlicensed short-range wireless protocols in indoor usage is an inexpensive way to increase capacity and provide fixed line service over mobile networks.

Benefits to Wireless Operators

- Wireless operators can enhance its cellular coverage by leveraging fixed broadband VoIP over WiFi at home or in office (where 30% mobile calls are conducted) with dual-mode handsets. (e.g. to cope with poor reception within steel-frame office buildings.)

Challenges and Benefits for Cable Companies

- Cable is pushing to add wireless services to their portfolio
 - In 2005, cable companies will add wireless to the mix, offering the quadruple play of cell phone, TV, broadband Internet, and VoIP phone service in one package.
 - The first cable company to make a push for this market will likely be Time Warner, which entered talks to launch a wireless MVNO through Sprint.
- In February 2004, Comcast Cable and T-Mobile USA Inc. have allied to offer the T-Mobile HotSpot Wi-Fi Internet service to Comcast's nearly five million high-speed Internet customers.
- CableLabs has a committee that is looking at how to integrate its PacketCable standard with wireless using 3GPP. That could allow a single set of control logic that won't discriminate between wireless and wireline services and technologies,

Benefits to Wireless/Wireline Dual Operators

- “If you’re a carrier that has a combination of wireless and wireline assets, it makes a lot of sense to reduce your costs, collapse into a common platform, and deliver the capacity to the user in the most economic manner.” -- Bill Smith, CTO of BellSouth.