

APNOMS 2003: Managing Pervasive Computing and Ubiquitous Communications

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Introduction

- Despite economic environment, we are making advances towards pervasive computing and ubiquitous communications
 - Convergence
 - Wifi, audio, video, cable, internet, PC, MP3
 - Softswitch and VoIP rollout
 - 3G deployments
 - Public Wifi hotspots
 - Mobile email, SMS based services
- But, no one technology covers the full spectrum
- Three key areas need to be solved to fully realize the potential:
 - Security
 - Synchronization
 - Coverage



Personal vs. Public computing devices



Security



- Primary concern: keep “bad” data out
 - Virus, DOS attacks, snoopers
 - Current example: Laptops on the road

- Primary concern: keep “good” data in
 - Credit cards, financial info, personal identification
 - Public resources won't be used effectively if not trusted
 - Current example: public web browsers



- Current state of the art:
 - SSL/https
 - IP Sec based VPN
 - GSM, CDMA encryption, WEP, EAP
 - Virus detection software
 - Firewalls, IDS, IPS

Secure



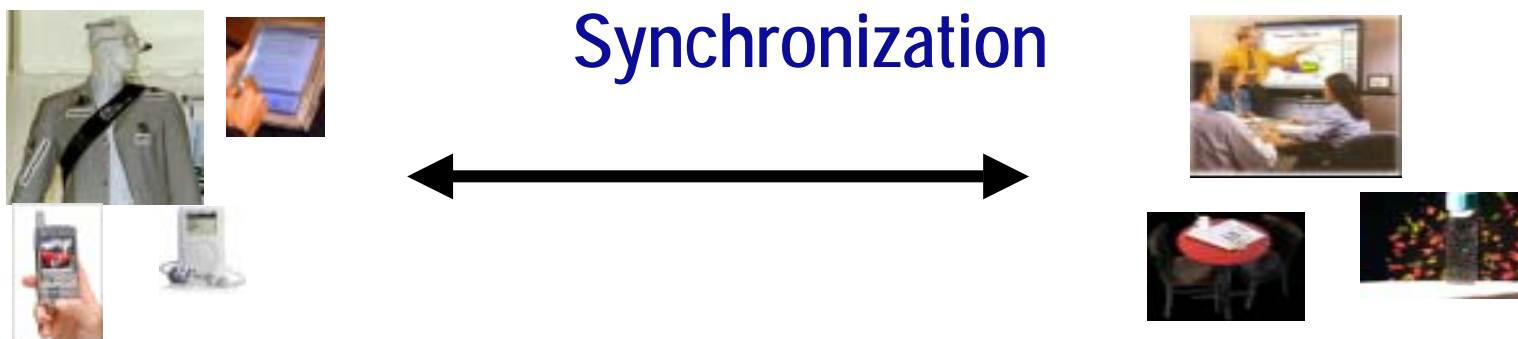
Ubiquitous



Security Management

- Security will continue to require both embedded and adjunct (OSS) solutions
- Current points of emphasis:
 - Fraud management/detection
 - Firewall
 - Virus protection/elimination
- OSS need to also address:
 - Security provisioning
 - Ease of connecting to networks, managing subscriber information regardless of access
 - Network, service, application usage analysis
 - Recognize patterns of attack
 - Inform users proactively
- But: need to recognize cost tradeoff
 - Treat as Quality metric





- We will continue to use specialized devices
 - Phone, PDA, Blackberry, laptop, desktop, workstation, MP3 player, corporate servers, public internet terminal, ...
- Need to have seamless transition between devices
 - Between personal devices, personal to public devices, and both to central/home/corporate data
 - Data is available when I need it, from whatever access device
- Primary standardization effort through SyncML
 - Calendars, contacts, PIM data
 - Now part of Open Mobile Alliance
- Expect more applications that need to sync data in the future

Management of Synchronization

- Synchronization applications mostly run peer-to-peer
 - Limited involvement, influence from OSS, network
- Primary impact is recognizing potential traffic volumes and patterns
 - Network sizing, traffic engineering models need to account for synchronization traffic
- Opportunity for value added service from telecom carriers
 - Users will need to trust privacy, integrity, and availability of central data



Coverage



- Does my personal device work wherever I go?
- Can I use best technology available?
 - WLAN/3G/2G roaming
 - Multi-band/Multi-tech devices
 - Multiple devices
- Beyond technology: business models need to mature
 - Lack of GPRS roaming agreements
 - Significant revenue generator
 - Becomes self-limiting

- Can I use a public device wherever I go?
- Do I need business relationship with all ambient environments?
- Can the device access my data with my profile?



Management of Coverage

- Large carriers need provisioning systems across technologies
 - Single subscriber “logical object” across multiple networks
 - Need to automate distribution and synchronization of data
 - Federated system with master control more likely than single centralized solution
- Service Fault and Performance management systems must also span technologies
 - For example, need to integrate views from Wireless and WLAN networks
 - Tools needed to reduce “finger-pointing”
 - Help isolate cause when service drops
- Business issues likely to be the biggest challenge
 - Technology issues not trivial either!



Summary



- More devices, using more types of access, can lead to more usage, more revenue, and healthier economics
- But, these need to be trustworthy, seamless, and provide ubiquitous/pervasive **services**
 - Need to focus on end user's experience of the service, and applications running over the network
 - Not enough to just provide a pipe
 - There remain technical, business, and political issues to resolve in the networking technologies themselves
 - NOM community needs to anticipate and help solve these issues to accelerate widespread adoption

