Multi-user operation and roaming over wide area networks

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Technology Evolution Causing Social Revolution

- Always-on
- Global Village
- Instant messaging
- Mobile Access
- Integrated Devices
Personal Communicator - Product Evolution

Future personal communication devices will gain functionality, and support all access technologies.
Evolution of Service Provider Focus

Communications service provider focus is changing from network to service

At home
On the road
At the office
While travelling
While waiting (e.g. at airport)
Abroad (at hotel)
Flying
Increasing User Expectations

Users will expect a minimum set of basic services from *their* service provider via *their* preferred personal communicator.

- Voice
- Messaging (inc SMS)
- Multicast (group communications)
- Internet and Intranet Access
- Broadcast (personalised infotainment)
Service Model Considerations

- Customer Relationship
- Control Signalling
- User Traffic

Remote Network
Satellite Network
Home Network
Or Other Intermediate Wide Area Networks
Public Networks
Network Relationships

- Intermediate Network Role
  - Visited Network (Trusted peer)
  - Transit Network (Untrusted peer)
  - Transport Network (Subordinate)
  - Other

![Diagram of network relationships showing user, visited, transit, home, and transport nodes with relationships indicated by arrows]

- a) Remote AAA (e.g., RADIUS)
- b) Peer (e.g., SIP?)
- c) Subordinate (e.g., MGCP?)
Local Access Technologies

User Technologies
- Smartphones
- GSM/GPRS or UMTS Picocell
- Bluetooth Base Station
- Notebooks

Local Access Technologies
- WLAN Access Point

Infrastructure Technologies
- Satellite Modem Technologies
- Aero
- Land Portable
- Fleet
Tight vs Loose Coupled Architectures

- **Tight-coupled**
  - Remote Network is extension of Satellite Network
  - Satellite Network appears as Visited Network
  - Changes to satellite network required for each new remote network technology
  - QoS an internal resource problem
  - Native Routing

- **Loose Coupled**
  - Remote Network reached across Satellite Network
  - Satellite Network is a Transit or Transport Network
  - Changes to gateways required for each new remote network technology
  - QoS an external interface problem!
  - Routing at edge
Tight vs Loose Coupled
Inmarsat BGAN Example

Tight Coupled Architecture

Loose Coupled Architecture
Inter-network Protocols (Examples)

- **AAA**
  - Should be extensible, e.g., RADIUS
  - Intermediate Network may act as a Proxy if operating as a Transit Network

- **QoS**
  - Session Description (SDP) to allow Resource Optimisation
    - SIP → Transit
    - Megaco → Transport
  - Generic QoS
    - RSVP
Opportunities

- A solution to this problem is a solution to the generic problem of supporting roaming across multiple domains, where resources are constrained in the wide area network for example:
  - 2G/3G over 3G (eg on trains)
  - 3G over fixed ISDN/ADSL (eg in remote office/hotel/home)
There is one overriding challenge...

Interfaces at mobile domain...
  • How should applications running on an external device request services from a mobile network?
    • This problem exists in all current mobile networks → all current interface definitions are inadequate!

STANDARDISATION IS REQUIRED