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CHIANTI: Robust Mobile Communication in Challenging Environments

EuroView 2008

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The World is disconnected ...



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... and will remain being disconnected.
Even if perfect geographical coverage would be there...



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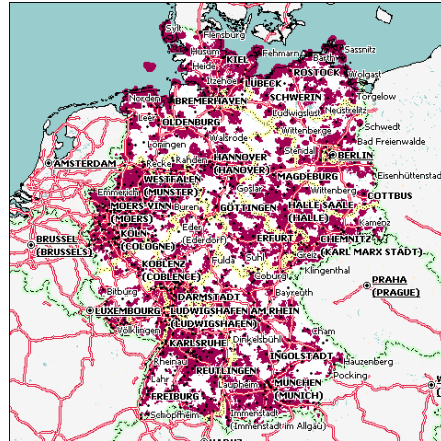
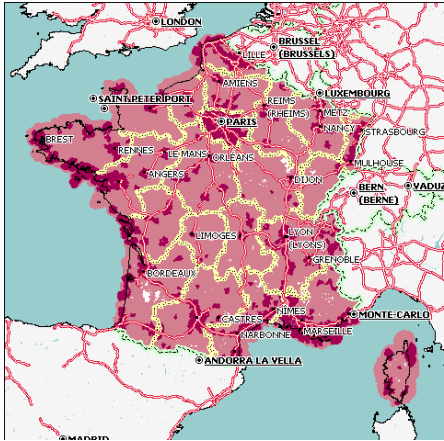
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...or at least not always connected...



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Sample Geographic Coverage:



SFR network in France (GSM + 3G)

Vodafone network in Germany (3G)



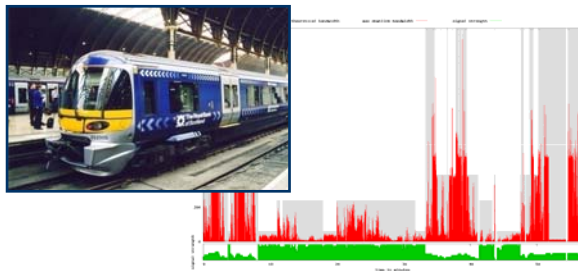
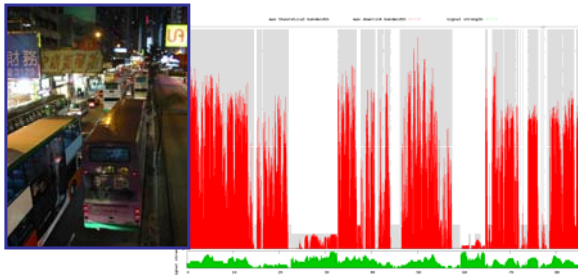
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CHIANTI Scenarios



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CHIANTI Scenarios



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- **Scenario 1: Mobile user aboard a train**
 - Vehicular infrastructure-based with operator support
 - No additional support on user devices
- **Scenario 2: Mobile user in road vehicles**
 - Bus, car, ambulance
 - More opportunistic usage of connectivity
- **Scenario 3: Nomadic use case**
 - Standalone user support
 - End-to-end principle applies to user's device



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Mobile Applications



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- Many applications are asynchronous in nature
 - Theoretically no need for “always on” connectivity today
 - Examples: e-mail, file transfer, peer-to-peer, even presence and messaging
- Applications don't communicate most of the time
 - Users read, type, or do other things
 - Examples: web, e-mail, calendar, chat, presence, ...
- Users shouldn't have to perform “busy waiting”
 - Let the applications operate asynchronously and notify the user when done
 - Examples: (peer-to-peer) downloads, tabbed browsing, e-mail, ...

... regardless of whether mobile or not.



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Application semantics do not require permanent or “end-to-end” connectivity...

...but many application protocols do.

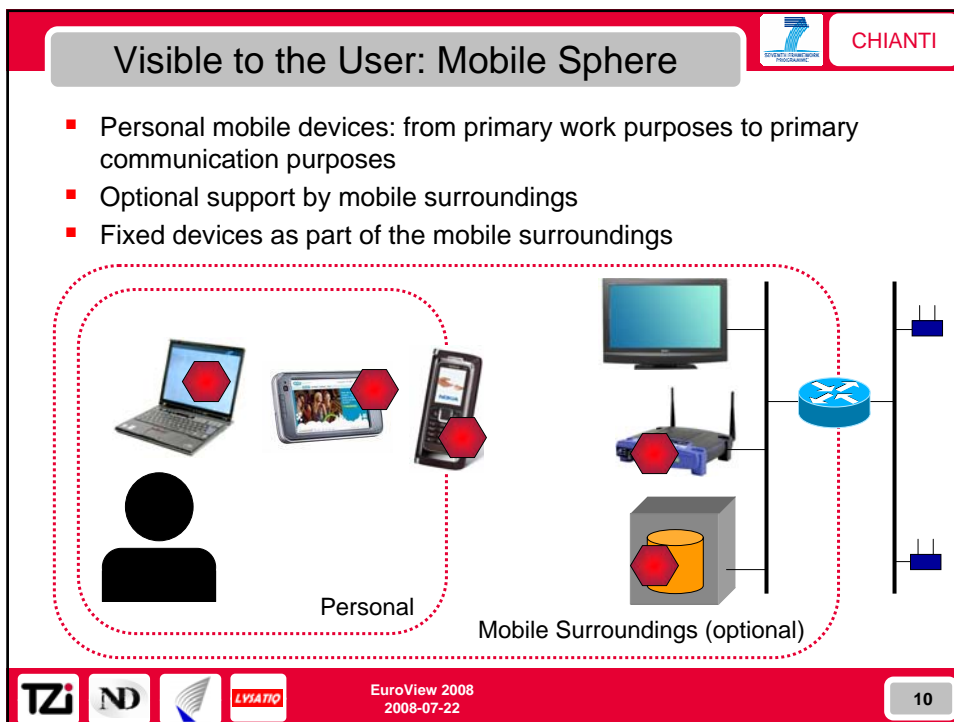
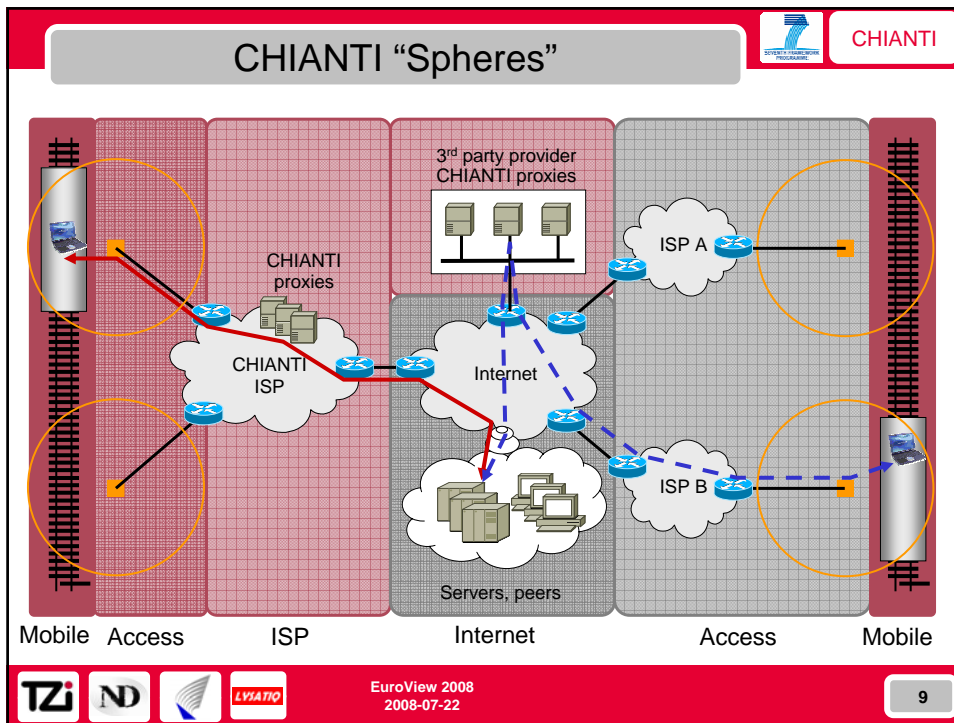
Instead of focusing on seamless connectivity:

“Seamless service perception”

In spite of non-seamless and non-ubiquitous connectivity.

Meta-goals:

- Making life easier for mobile users
- Making mobile work time efficient
- Reducing cost for mobile enterprises



Research Topics



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- Analysis of use cases and business models
 - Supporting present business roles (e.g., WISPs, operators)
 - Enabling new business opportunities (CHIANTI service providers)
- Protocol analysis and development
 - Real-world measurements of (transport) protocol performance
 - Traffic traces for modeling and simulating communication patterns
 - Development and evaluation of robust transport/session protocols
- Architecture design
 - CHIANTI support functions with respect to Future Internet concepts
 - Adapting to challenging network conditions
 - Security: crucial role of trustworthy intermediaries
- Application Development
 - Enabling present applications to operate in the presence of disconnections
 - Content distribution and robust media-streaming



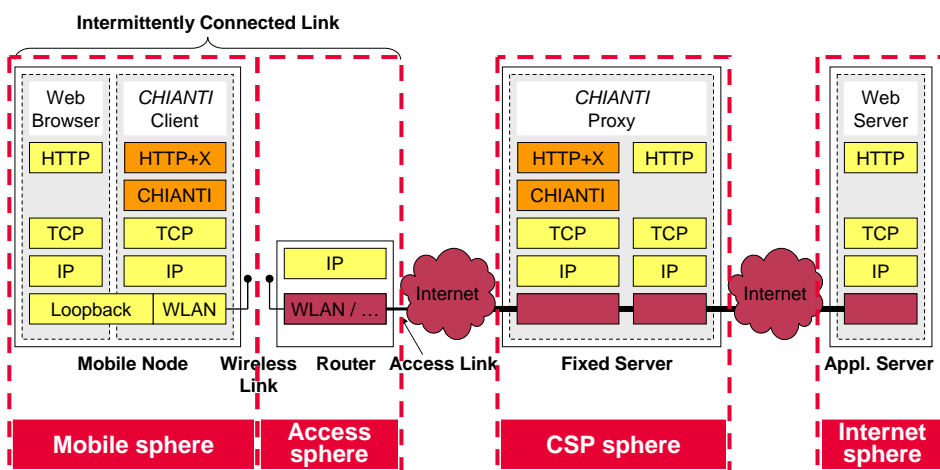
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Architecture and Components

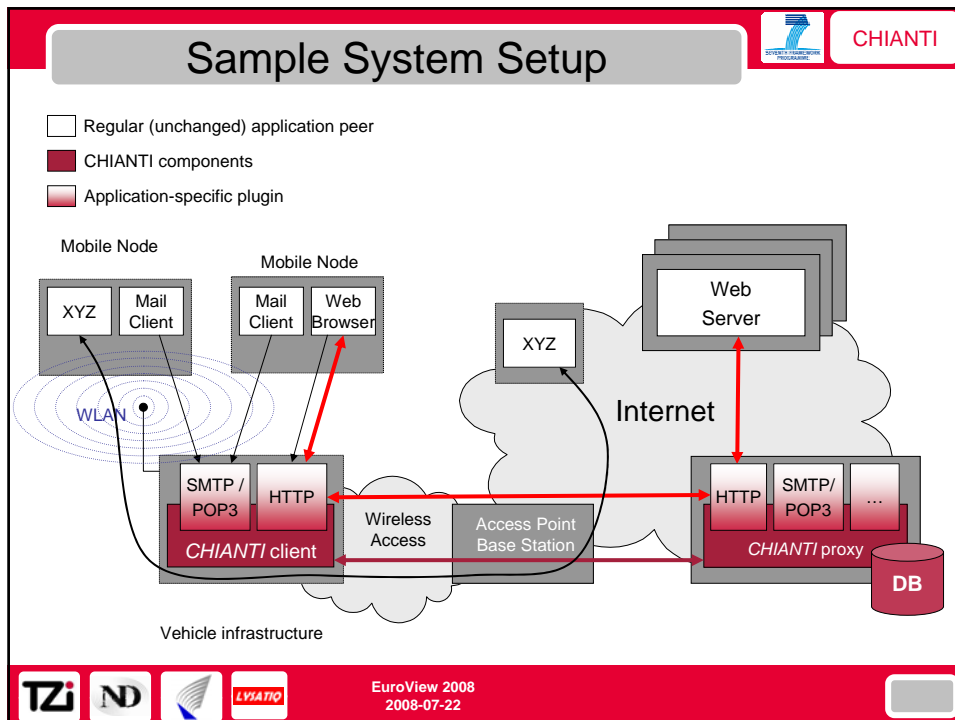






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- ## Conclusion
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- CHIANTI: Dealing with disconnections to improve users' "quality of experience"
 - Evolutionary approach based upon the present Internet
 - Network infrastructure
 - Applications
 - CHIANTI overlay incrementally deployable (tomorrow!)
 - Clients on mobile nodes and/or in mobile infrastructure
 - Infrastructure proxies (individual, farms, peer networks)
 - Robust transport + range of application support
 - Different degrees of integration with service providers
 - Supporting business models for incumbent and new players
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