

# VHO – Innovation prototyping for vertical handover

## Publications and standardisation contributions

17.1.2005

The VHO project of Ericsson Finland, PM&RG of the Helsinki University of Technology, Radionet and TeliaSonera has produced the following publications and contributions to standardisation by the end of September 2004. Complete list will be provided at <http://www.cs.hut.fi/~pmrg/VHO.html>.

### Publications

- 1) Asplund, H. and Ranta, M. 2003. "How use cases are defined from scenarios in development of mobile services", In proceedings of COST269 Conference, pp. 375-378, Helsinki, Finland, 3-5, September 2003. COST. ISBN 951-558-125-7.
- 2) M. Björkgren, "Heterogeneous networks - Future communication environment" - 12th Summer School on Telecommunications (LUT 2003).
- 3) S. Floyd, T. Henderson, A. Gurtov, The NewReno Modification to TCP's Fast Recovery Algorithm, RFC 3782, April 2004.
- 4) Gurtov, Eliminating Aborted Data Delivery over Cellular Links. Poster at ACM Mobicom'03, September 2003. Extended abstract in ACM Mobile Computing and Communications Review, 7(4):53-54, October 2003.
- 5) Gurtov, S. Floyd, Modeling Wireless Links for Transport Protocols, to appear in ACM CCR. Simulation scripts.
- 6) Gurtov, J. Korhonen, "Effect of Vertical Handovers on Performance of TCP-Friendly Rate Control", ACM MCCR, 2004.
- 7) Kristiina Karvonen, Jarmo Parkkinen and Liina Poropudas: "Investigating Mobile Use for Wearable Product Concept Design", in Proceedings of the 10th International Conference on HCI (HCI2003), June 22-27, 2003, Crete, Greece.
- 8) J. Korhonen, "Performance Implications of the Multi Layer Mobility in a Wireless Operator Networks", University of California Berkeley, Fourth Berkeley-Helsinki Ph.D. Student Workshop on Telecommunication Software Architectures - July 2004.
- 9) Ari Maunuksela, Marko Nieminen, "Micro-mobility supported WLAN networks-An empirical study of new IP protocol to support mobility and connection handovers", WWRF, 2003, International Journal of Mobile Communications.
- 10) H. Inamura, G. Montenegro, R. Ludwig, A. Gurtov, F. Khafizov, TCP over Second (2.5G) and Third (3G) Generation Wireless Networks, RFC 3481 (BCP 71), February 2003.
- 11) Jokela, Nikander, Melen, Ylitalo, Wall, "Host Identity Protocol: Achieving IPv4 - IPv6 handovers without tunneling", Evolute workshop 2003, University of Surrey, Guildford, UK.
- 12) Jokela P., Wall J., Melen J., Rinta-aho T., Kauppinen T., Mahkonen H., Jokikyyny T., Kuparinen M., Korhonen J., "Handover Performance with HIP and MIPv6", International Symposium on Wireless Communication Systems, to appear in Proceedings of ISWCS'04.
- 13) Lagutin, D. and Ranta, M., "Challenges of structuring data from usability and user studies", In proceedings of COST269 Conference, pp. 332-335, Helsinki, Finland, 3-5 September 2003. COST. ISBN 951-558-125-7.
- 14) Nikkilä, R., Lagutin, D., Asplund, H. and Ranta M. 2004. Prototyping of vertical handover enabled services. In proceedings of WWRF11 - Wireless World Research Forum, Oslo,

- Norway, 10-11 June 2004. Keywords: prototyping, mobile services, innovation prototyping. Avainsanat: prototypisointi, mobiilipalvelut, innovaatioprototypisointi
- 15) Parkkinen, J. and Ranta, M., "A zero prototype as an usability tool", In proceedings of COST269 Conference, pp. 156-158, Helsinki, Finland, 3-5, September 2003. COST. ISBN 951-558-125-7.
  - 16) Sébastien Pierrel, Topi Erlin and Janne Roslöf, Tony Jokikyyny and Hannu Lehtinen, "A Prototype for Policy Driven Control of Heterogeneous Network Access" 2nd Workshop on Applications of Wireless Communications (WAWC'04), in conjunction with The 13th International Summer School on Telecommunications, August 4-6, 2004, Lappeenranta, Finland.
  - 17) Ranta, M. and Asplund, H., "Brokering based balancing of viewpoints - experiences from pre-product development of mobile services", In proceedings of COST269 Conference, pp. 280-284, Helsinki, Finland, 3-5, September 2003. COST. ISBN 951-558-125-7.
  - 18) Ranta, M. and Asplund, H., "An introduction of the innovation prototyping research - a position paper of the PM&RG research group", The Nordic Workshop on UML based Software Development, Blekinge Institute of Technology, Ronneby, Sweden, August 2003.
  - 19) Ranta, M. and Asplund, H., "Utilizing scenarios in service idea generation - a case of distant participation for a seminar", In proceedings of COST269 Conference, pp. 379-386, Helsinki, Finland, 3-5 September 2003. COST. ISBN 951-558-125-7.
  - 20) Ranta, M., Asplund, H., Saarinen, T. and Sahi S. 2004 Use cases and scenarios in innovation prototyping VHO Play. In proceedings of WWRF11 - Wireless World Research Forum, Oslo, Norway, 10-11 June 2004. Keywords: Product development, modelling mobile and ubicomp services, use case, scenario, collaborative design, innovation prototyping. Avainsanat: Tuotekehitys, mallittaminen, mobiili- ja ubicomp-palvelut, käyttötapaus, skenaario, suunniteluyhteistyö, innovaatioprototypisointi.
  - 21) Ranta, M., Kaija, K., Asplund, H. and Sahi, S., "Relationship of requirements engineering to innovation prototyping. In proceedings of COST269 Conference, pp. 387-391, Helsinki, Finland, 3-5 September 2003. COST. ISBN 951-558-125-7.
  - 22) Särelä Mikko. Measuring the effects of mobility on reactive ad hoc routing protocols. Reprint of Master's thesis. Research Report A91, Helsinki University of Technology, Laboratory for Theoretical Computer Science, Espoo, Finland, May 2004. Keywords: ad hoc networks, routing, mobility management, mobility modelling, simulation. Avainsanat: ad hoc -verkot, reititys, mobiliteetin hallinta, mobiliteetin mallittaminen, simulointi
  - 23) Jukka Ylitalo, Tony Jokikyyny, Tero Kauppinen, Antti J. Tuominen, and Jaakko Laine, "Dynamic Network Interface Selection in Multihomed Mobile Hosts", In Proceedings of the Thirty-Sixth Hawai'i International conference on System Sciences (HICSS-36), Hawai'i, US, January 2003.
  - 24) Jukka Ylitalo, Jan Melén, Pekka Nikander, and Vesa Torvinen, "Re-thinking Security in IP based Micro-Mobility", to appear in Proceedings of the 7th Information Security Conference (ISC'04), Palo Alto, CA, USA, September 27-29, 2004.
  - 25) Jukka Ylitalo and Pekka Nikander, "A new Name Space for End-Points: Implementing secure Mobility and Multi-homing across the two versions of IP", The Fifth European Wireless Conference, Mobile and Wireless Systems beyond 3G, February 24-27, 2004, Barcelona, Spain.
  - 26) Jukka Ylitalo and Pekka Nikander, "BLIND: A Complete Identity Protection Framework for End-points", to appear in Proceedings of the Twelfth International Workshop on Security Protocols, (Cambridge'04), Sidney Sussex College, Cambridge, England, April 26-28, 2004.
  - 27) Jukka Ylitalo, Pekka Nikander, Jan Melen, "SPINAT: A Security Framework for Local IP Mobility Management", MobiSys 2004: The Second International Conference on Mobile Systems, Applications and Services, June 6-9, 2004, Boston, MA, USA.

## Papers Submitted

- 28) A. Maunuksela, J. Määttä, J. Tyni, M. Saarinen, M. Björkgren, "Towards parallel use of micro- and macro mobility supporting IP-protocols in Wi-Fi hotzone networks: Experiences and architecture issues in large scale WLAN network implementations".

## Reports

- 1) Ranta M., Asplund H. and Saarinen T. (editors). An overview to the results of PM&RG, VHO - Innovation prototyping for vertical handover, First project year 2003 of VHO. Finland. April 2004.
- 2) Saarinen T., Asplund H. J., Ranta M., Korhonen J., Jokikyyny T., Rinta-aho T., Jokela P. and Maunuksela A. 2004. Onko verkolla väliä? In Proessori, Finland, November 2004. Keywords: innovation prototyping, mobile and ubicomp services, product development, prototyping, service idea generation, vertical handover, experimentation, collaboration of networks. Avainsanat: innovaatioprototypisointi, mobiili- ja ubicomp-palvelut, tuotekehitys, prototypisointi, palveluideoiden kehitys, hyppy erillisten verkkojen välillä, koejärjestely, verkkojen yhteistoiminta.
- 3) VHO – Innovation prototyping for vertical handover. In NETS Final Report, Tekes, Finland, January 2005.
- 4) Thematic group 1a - Collaborative networks, In NETS Final Report, Tekes, Finland, January 2005.

## Master's theses

- 1) Erkkilä Antti, "IEEE 802.1X in an Operator WLAN Environment", Helsinki University of Technology, Networking Laboratory, Espoo, Finland, May 2003.
- 2) Luostarinen Tomi, "Implementing Mobile IP into GPRS-WLAN Networks", Helsinki University of Technology, Networking Laboratory, Espoo, Finland, March 2003.
- 3) Särelä Mikko. Measuring the effects of mobility on reactive ad hoc routing protocols. Reprint of Master's thesis. Research Report A91, Helsinki University of Technology, Laboratory for Theoretical Computer Science, Espoo, Finland, May 2004.
- 4) Tähtinen Tero. HTTP-välityspalvelimen käyttö tapahtumien keräämiseen, M.Sc. thesis, Helsinki university of Technology, Department of computer science and engineering, Espoo, Finland, December 2004. Keywords: HTTP, WWW, välityspalvelin, proxy, selain, tiedon kerääminen, välimuisti, eväste, käyttäjän yksilöiminen, käytettävyys, HTTP/1.1

## PhD theses

- 1) Andrei Gurtov, "Efficient Data Transport in Wireless Overlay Networks", Department of Computer Science, Series of Publications A, Report A-2004-2, University of Helsinki, April 2004.

## Standardisation contributions

### ***HIP related Internet-Drafts released during 2003:***

- Host Identity Protocol
  - draft-moskowitz-hip-06
  - draft-moskowitz-hip-07
  - draft-moskowitz-hip-08
- HIP Mobility and multihoming
  - draft-nikander-hip-mm-00
  - draft-nikander-hip-mm-01
- Host Identity Protocol Architecture
  - draft-moskowitz-hip-arch-05

### ***HIP related Internet-Drafts released during 2004:***

- Host Identity Protocol Architecture.
  - draft-moskowitz-hip-arch-06
- Host Identity Protocol.
  - draft-moskowitz-hip-09
  - draft-ietf-hip-base-00
- End-Host Mobility and Multi-Homing with Host Identity Protocol.
  - draft-nikander-hip-mm-02
  - draft-nikander-multi6-hip-00.txt
  - draft-nikander-multi6-hip-01.txt
- Host Identity Protocol (HIP) Domain Name System (DNS) Extensions.
  - draft-nikander-hip-dns-00
- A Bound End-to-end tunnel (BEET) mode for IPsec ESP.
  - draft-nikander-esp-beet-mode-01.txt
  - draft-nikander-esp-beet-mode-02.txt

### ***RADIUS related Internet-Drafts released during 2004:***

- RADIUS EXTensions
  - draft-adrangi-radius-location-information-attribut-01.txt
  - draft-adrangi-radius-Chargeable-User-Identity-00.txt
  - draft-adrangi-radius-attributes-extension-01.txt

### ***Transport related Internet-Drafts released during 2004:***

- The Eifel Response Algorithm for TCP
  - draft-ietf-tsvwg-tcp-eifel-response-05.txt

### ***WLAN Roaming related GSMA PDRs released during 2003:***

- IR.62 End-to-End WLAN Roaming Test Cases
  - PDR IR.62, “End-to-End WLAN Roaming Test Cases”, GSMA, June 2003.

### ***WLAN Roaming related GSMA PDRs released during 2004:***

- IR.61 WLAN Roaming Guidelines – Inter-Operator Handbook
  - SCR to PDR IR.61 v3.0.3, Incorporating the “EAP-SIM Based Roaming Guidelines Document”, GSMA, June 2004.
  - PDR IR.61 v3.1.0, “WLAN Roaming Guidelines – Inter-Operator Handbook”, GSMA, August 2004.

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