

STREAMMOBILE

TIC 2001-0633-C03

Streaming de contenidos multimedia hacia
dispositivos móviles con retribución por micropago

*Streaming of multimedia content
toward mobile devices with (micro)pay-per-view*

<http://vneumann.etse.urv.es/streammobile>



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Co-ordinated project

Subproject 1

Universitat Rovira i Virgili (URV)
Prof. Josep Domingo - Ferrer

Subproject 2

IIIA-CSIC
Dr. Vicenç Torra Raventós

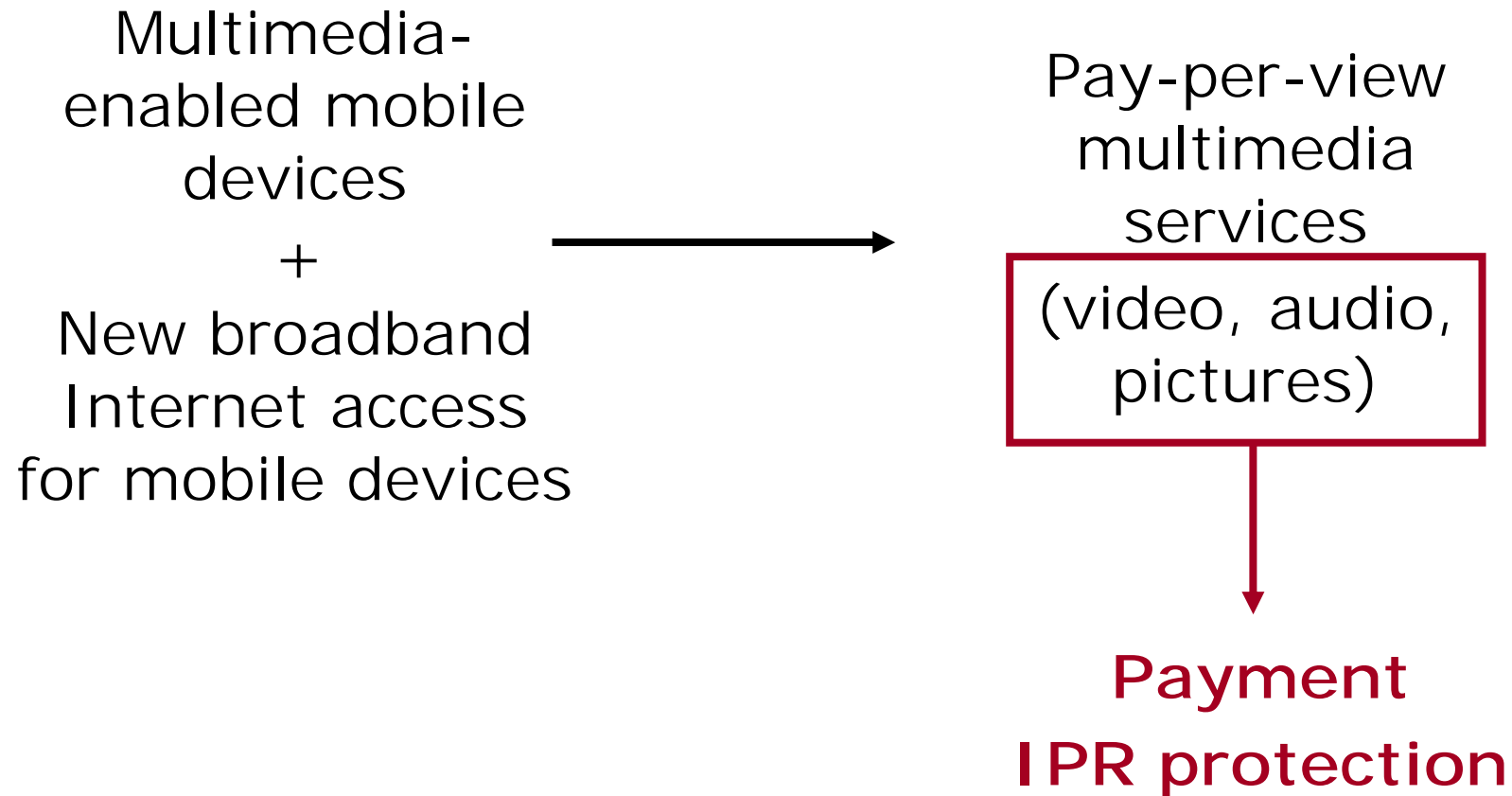
Subproject 3

Universitat Oberta de Catalunya (UOC)
Dr. Jordi Herrera Joancomartí



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Goals



Goals

Payment

- Pay-as-you-watch (video/audio streams)
 - The customer pays as she is receiving the content
 - Use of micropayments

IPR protection

- Watermarking. Embed invisible marks into a content
 - Robustness
- Fingerprinting. Identify a specific customer using the mark
 - Collusion attacks



Project status

Management and operation of the project

- Quarterly meetings
- Videoconferences
- Relation with companies
 - **SCYTL Online World Security** (international PCT patent)
 - **Fujitsu** (collaboration agreement under negotiation)
 - **Vodafone** (OPIUM project, UMTS experimental network)



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Project status

Analysis of requirements

- Streaming of content with micropay-per-view
 - Based on the requirements for the **digital video library of UOC**
 - Access to resources controlled by using micropayment-based credits
- Advanced cryptographic protocols for value-added applications
 - E-gambling
 - E-voting



Project status

First demonstrator

- Web-based pay-as-you-watch video server
 - Video server
 - PayWord micropayment server
- Desktop PC client (v.1)
- WLAN enabled PDA client (v.2)

📖 IEEE Trustbus'02 [DM02]

📖 Boletín RedIris [DMS03b]

📖 Master's thesis [Mart02]



Project status

Copyright protection

- Robust watermarking
 - MPEG video watermarking
 - 📖 SPIE IV [MVS02]
 - 📖 SPIE V [VSV03]
 - 📖 SPIE VI [MS04] (submitted)
 - 📖 Master's theses [Vent02, Mart03b, Cama02]

Project status

Copyright protection

- Watermarking robust against multiple attacks
 - Mixture-based image watermarking
 - Image watermarking robust against compression
- 📖 IEEE ITCC'02 [DS02a]
- 📖 VII RECSI [HM03]
- 📖 IEEE ITCC'03 [HMM03]



Project status

Copyright protection

- Audio watermarking
 - MPEG-Layer3
 - 📖 LNCS (to appear.) [MHM03]



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Project status

Copyright protection

- Invertible watermarking
 - Inversion of Hartung & Girod spread spectrum image watermarking system

📖 IEEE ITCC'02 [DS02b]



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Project status

Copyright protection

- Short 3-collusion secure fingerprinting codes
 - ▣ Shorter than Boneh - Shaw codes
 - 📖 IEEE Transactions on SMC-C [SD03]
 - 📖 LNCS 2384 [SD02a]
 - 📖 IEE Electronics Letters [SD02b]
 - 📖 VII RECSI [SD02c]



Project status

Copyright protection

- Asymmetric fingerprinting
 - Asymmetric fingerprinting based on a TTP
 - Prototype implementation (FingerTrust)
- 📖 IEEE Trustbus'03 [MSDS03]
- 📖 Research report [MMSD03]



Project status

Copyright protection

- Fingerprinting for multicast communications
 - Encryption-based video fingerprinting

📖 IEEE ITRE'03 [MDS03b]



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Project status

Copyright protection

- Testing of privacy in transactions
 - State of the art in record linkage
 - Algorithm for record linkage when no attributes are shared across data sources
- 📖 Information Fusion in Data Mining - Springer [TD03]
- 📖 Statistics & Computing [DT03]



Project status

Micropayments

- Smart card based scalable micropayments
 - Multicast environments

📖 CARDIS'02 [DMS02]



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Project status

Second demonstrator

- Server design
 - ▣ Designed to meet STREAMOBILE requirements
 - 📖 IEEE ITCC'03 [MDS03a]
 - 📖 II SCE [MDS03] (fingerprinting module)



Project status

Field tests

- To be done during the third year, when
 - The 2nd demonstrator will be finished
 - A WMAN or campus WLAN (and hopefully a 3G network) will be available for testing



Arisen problems

Problem

- UMTS is having a **huge** (eternal?) delay
 - No networks (a few for testing...)
 - No devices

Solution

- WLAN simulating 2.5G / 3G channels
 - 📖 Master's thesis [Camp03]
- Migrating to WLAN?
 - 📖 IEEE ITCC'03 [HP03]
 - 📖 II SCE [PHM03]



Results index

Results related to student education

| Ph D Theses | |
|-------------------|---|
| Finished | 5 |
| Under development | 2 |

| | |
|-----------------|---|
| Master's Theses | 8 |
|-----------------|---|

Results index

Relevant publications

| | |
|-------------------|-----------|
| Books (as editor) | 2 |
| Books (as author) | 2 |
| SCI articles | 14 |
| Non SCI articles | 3 |
| Proceedings | 25 |
| | 43 |

Patents

1 International Patent



Results index

Related projects and collaborations

| | |
|------------------------------------|--|
| Networks of Excellence (6 EU FP) | 1 |
| 5 EU FP Projects | 3 (1 as co-ordinator, 1 as steering committee) |
| Spanish PROFIT projects | 2 |
| Catalan thematic research networks | 2 (both as co-ordinator) |
| Transference contracts | 2 |

Collaboration with U. de Vigo, Information Security Group at UPC, Tsukuba University, Sapporo University, École Centrale de Nantes, IEEE Information Theory Spanish Chapter (chairman), IFIP WG 8.8 on Smart Cards (secretary)



Results index

Salvà i Campillo Prize 2003 to the most outstanding research



Awarded by the Catalan Association of Telecom Engineers in recognition for our work in copyright protection.

Delivered on February 2003 in Barcelona by the Spanish Minister of Science and Technology



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