Deliverable 7.5   LinkedTV Dissemination and Standardisation Report v2

Lyndon Nixon, MODUL University Vienna
Other contributors:
The LinkedTV consortium

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Work Package 7: Dissemination

LinkedTV

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[1] • PU = Public

  • PP = Restricted to other programme participants (including the Commission Services)

  • RE = Restricted to a group specified by the consortium (including the Commission Services)

  • CO = Confidential, only for members of the consortium (including the Commission Services))

Table of contents

1 LinkedTV: Dissemination and Standardisation Activities

Communication by EU projects to the outside world, including specific target groups of interest, whether they be scientific, academic, industrial or public institutions, including the EC itself, is a very important part of the projects activity. While of course a focus needs to be kept on achieving meaningful research and development goals which form the content of the external dissemination, the achievement of the goals should not be seen as separate from the task to announce and share those achievements with the wider communities. This is not just a question of demonstrating the good investment of the European Commission in funding the research work in the first place, but also ensuring that others have the opportunity to learn from and take up project results in their own academic studies, scientific experiments, commercial products, or public services. This deliverable reports thus on the external dissemination and standardisation activities of the LinkedTV project for the period of month 19 until month 30 (April 2013 to March 2014), namely:

- How we disseminated project activities and results as widely as possible in all relevant and effective channels, adapted appropriately to differing target groups;

- How we plan to standardize data models, APIs, vocabularies, ontologies and other specifications created by or amended in the project.

1.1 History of the document

Table 1: History of the document

Date	Version	Name	Comment
18.03.14	V0.7	Lyndon Nixon	Created initial structure and content of deliverable
19.03.14	V0.8	Lotte Baltussen, Heike Horstmann	Quality assurance check, slight corrections and remarks
24.03.14	V0.9	Lyndon Nixon	Updated standardisation section, responded to QA remarks
28.03.14	V0.95	Lyndon Nixon, Lotte Baltussen	Finalised standardisation section, second quality assurance check.
01.04.14	V1.0	Heike Horstmann	Final formatting and quality check
01.04.14	V1.0	Lyndon Nixon	Small changes from final quality check

2   LinkedTV Dissemination Report

In the last 12 months of LinkedTV we used the following channels to continue to disseminate project activities and results:

- The website at linkedtv.eu

- Social Web channels, e.g. Twitter, Slideshare, YouTube

- PR materials about the project: leaflets/flyers, brochures, posters, videos/films

- Participation at clustering activities initiated by the EC

- Participation at conferences, seminars, trade fairs

- Organisation of academic and industry events (e.g. workshops, info days)

- Publications in scientific / trade journals

2.1   LinkedTV website

Figure 1. The LinkedTV website frontpage

The website at www.linkedtv.eu (Fig 1) has been introduced in deliverable D7.1: LinkedTV website.

Concrete results:

- **News items**. In the period April 2013 to March 2014 we published 49 news items. Each news item has its own URL, categories and tags (Fig 2), and can be directly liked, recommended (via Facebook) or commented upon.
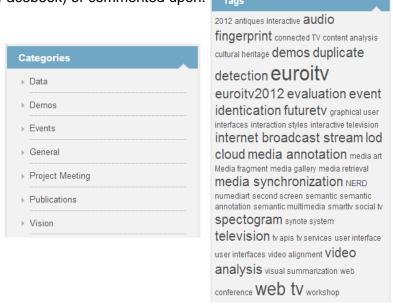

Figure 2. News item categories and tags

- **Website sections**. The site navigation was expanded as part of the preparation for the 1st LinkedTV Demonstrator (cf. Deliverable 7.4) with the completion of the online lists of LinkedTV Demos and LinkedTV Tools & Services, highlighted within a top-level menu item "Demos & materials". This section also contains updated lists of LinkedTV publications, presentations, deliverables and the current newsletter. Furthermore, a separate section "Events" was added to highlight LinkedTV supported events (past and future). With the completion of the project's second year, all content sections (Scenarios, Research and Development) were updated with the latest project results. Dedicated pages were created for the two LinkedTV scenario demonstrators (Linked News and Hyperlinked Documentary), linked to from updated scenario pages.

- **Online visibility, e.g. Search Engine Optimisation (SEO)**. In the period March 23, 2013 to March 17, 2014 the website has had a total of 7,976 visits, 5,013 unique visitors and 15,758 page impressions. There was an average of 1.98 pages seen at each visit, an average visit duration of 1 min 59 sec, and 60.95% of visits were new. This compares favourably with the figures from the first 18 months: total visits/month are around 33% higher and unique visitors are 50% higher than this first period, while time on site and pages seen has stayed stable. The percentage of new visitors has increased slightly. 20% of visitors came from the US, UK or China. 32% of visitors came via a search engine, 9% via referral of another site and 8% via social network.

2.2 Social Web channels

LinkedTV has a RSS feed at www.linkedtv.eu/feed/ and a Twitter stream at twitter.com/linkedtv. It also shares video material on its YouTube channel at youtube.com/user/LinkedTVeu and presentations using SlideShare at slideshare.net/linkedtv. We additionally set up a Google+ account which publishes a post when videos are added to the LinkedTV YouTube channel.

Concrete results:

- **Distribute news regularly via RSS and Twitter.** This is set up automatically from the news blog on the website, while we can also additionally tweet when necessary (live events, use specific mentions or hashtags). Our Twitter account has made 157 tweets to date (109 in the past 12 months) and has now 158 followers (almost double the number 12 months ago). We are also increasingly mentioned by other accounts or our tweets are retweeted.

- **Distribute videos via YouTube.** The YouTube channel has now 12 videos, consisting of 5 videos from the video analysis work, 4 videos from the personalisation work, and 3 videos created for the LinkedTV scenarios. The videos are also highlighted by embedding them on the LinkedTV website and we encourage their embedding on other sites too. The channel still needs more promotion (20 subscribers and total 1,500 views) but exists as a permanent record of LinkedTV outputs.

- **Distribute presentations and deliverables via SlideShare.** The Slideshare channel has been used since the beginning of LinkedTV (the first upload was our project introduction slides) as a means to distribute online project material. The materials can then be embedded in the LinkedTV website or elsewhere. We have to date 39 shares and 84 followers. There are 18 presentations, where the introduction slides uploaded 20 months ago have now 26,300 views and the second year update to the LinkedTV introduction (uploaded 4 months ago) has had 6,700 views. There are 21 documents: the newsletters, poster and 18 deliverables, where D1.1 State of the Art for Hypervideo has been particularly popular, with 3,624 views to date.

2.3 PR materials

The LinkedTV project has attended relevant industry and academic/scientific events and the distribution of materials at those events is an effective way to remind people met at the event of the project.

Concrete results:

- **Produce a project factsheet.** The one page factsheet is a requirement of the EC as project funder and is distributed both via the EC's own website (CORDIS) as well as the projects website.

Figure 3: The LinkedTV Poster

- **Produce a project postcard.** This was done. The postcard was distributed to all partners who could distribute them in their organisation or at events they attend. Postcards were brought to events which LinkedTV organized or participated in (see sections 2.4, 2.5 and 2.6).

- **Produce a project newsletter.** In the second year of the project an 8-page newsletter was created. It is available online at www.linkedtv.eu/newsletter and can be downloaded as PDF. A printed version was distributed to all partners who could distribute them in their organisation or at events they attend. Newsletters were brought to events which LinkedTV organized or participated in (see sections 2.5 and 2.6).

- **Produce other materials.** For our participation at ICT 2013 we created a LinkedTV poster (also re-used at the European Data Forum 2014). The poster (Fig 3) is available online at http://www.slideshare.net/linkedtv/linkedtv-poster

2.4 Clustering activities

The LinkedTV project has worked together with other EU projects where common goals, research topics, or complementary activities can be identified.

Concrete results:

- **Coordination with the hbbTV consortium.** Given the importance of hbbTV as a client platform[2] for interactive TV solutions developed by LinkedTV, we will coordinate with the hbbTV consortium, particularly through the consortium partner RBB and the external partner IRT. In this regard, LinkedTV partners held a first meeting at Sound and Vision (together with Noterik and hbbNEXT partner TNO) on May 30, 2013. IRT participated in a follow-up meeting on 28 January, 2014 where LinkedTV partners (CONDAT, Noterik, RBB) presented their plans for a hbbTV implementation and CONDAT and MODUL spoke with hbbTV consortium vice-chair Jon Piesing as well as IRT representatives during the W3C TV & Web workshop (13 March, 2014). A follow up Dutch HbbTV meeting (Sound and Vision, Noterik, TNO) is planned for April/May 2014.

- **NEM Summit.** Once a year, these meetings involve projects from all units which share a R&D focus on Networked and Electronic Media (NEM) topics. The NEM Summit 2013 took place in October 2013 and LinkedTV was present with two papers:

  - Daniel Stein, Stefan Eickeler, Rolf Bardeli, Evlampios Apostolidis, Vasileios Mezaris, and Meinard Müller. **Think Before You Link — Meeting Content Constraints when Linking Television to the Web.** NEM Summit, 28-30 October 2013, Nantes, France

  - Daniel Stein, Alp Öktem, Evlampios Apostolidis, Vasileios Mezaris, José Luis Redondo García, Raphaël Troncy, Mathilde Sahuguet, Benoit Huet. **From Raw Data to Semantically Enriched Hyperlinking: Recent Advances in the LinkedTV Analysis Workflow.** NEM Summit, 28-30 October 2013, Nantes, France

2.5 Conferences and other events

The LinkedTV project has attended and participated in conferences and events covering topics relevant to the project.

This is in addition to the conferences and events LinkedTV has attended because it was (co-) organizing the event or a part of the event (see section 2.6) or because it published scientific work at the event and made a presentation (see section 2.7).

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[2] See http://hbbtv.org

Concrete results:

- International Conference on Multimedia Retrieval (ICMR 2013), April 2013 (CERTH and EURECOM participated in the Panel entitled "Recommendation Systems have taken Control: is Multimedia Retrieval still Relevant?", see http://impact.utc.edu/icmr2013/program.php)
- 2nd International Workshop on Real-Time Analysis and Mining of Social Streams (RAMSS 2013), at WWW 2013 (EURECOM Keynote Talk: "MediaFinder: Collect, Enrich and Visualize Media Memes Shared by the Crowd"[3])
- IBC 2013, September 2013 (CONDAT attended as industry participant)
- Mindtrek Festival 2013, October 2013 (RBB and Noterik participated and gave presentations)
- Medientage 2013, October 2013 (CONDAT attended as industry participant)
- Workshop on Event-based Media Integration and Processing, at ACM Multimedia 2013, October 2013 (EURECOM Keynote talk: "Event-based Summarization for Media Hyperlinking"[4] + panel participation)
- FIAT/IFTA 2013, October 2013 (Sound and Vision gave an invited talk[5])
- Bits&Chips 2013 Embedded Systems, November 2013 (Noterik giving LinkedTV demo at their booth)
- ICT 2013, November 2013 (LinkedTV exhibition booth, many partners)
- CSW - Corporate Semantic Web, November 2013 (CONDAT presentation)
- Winter School on Multimedia Processing and Applications, January 2014 (LinkedTV speakers – MODUL, CERTH and EURECOM – at winter school)
- DBpedia Meeting, January 2014 (UEP Participation at the 1st DBpedia Community Meeting and presentation of the LinkedTV-supported Linked Hypernyms Dataset)

2.6 Organisation of events

The LinkedTV project also (co-)organised events which promoted LinkedTV-specific research and development topics.

Concrete results:

- Special session "Social Events in Web Multimedia" at the International Conference on Multimedia Retrieval (ICMR 2013), Dallas (USA), April 2013
- 2nd International Workshop on Web of Linked Entities (WoLE 2013) at WWW 2013, Rio de Janiero, May 2013
- 1st Worldwide Web Workshop on Linked Media (LiME 2013) at WWW2013, Rio de Janiero, May 2013
- Volt! Dutch Technology Week, Eindhoven, June 2013
- Mediapark Jaarcongres 2013, Hilversum, June 2013
- FutureTV workshop @ EuroITV 2013, Como, June 2013
- Special session on LinkedTV, INTETAIN 2013, Mons, July 2013
- Social Event Detection 2013 (SED) @ MediaEval 2013, Barcelona, October 2013

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[3] http://de.slideshare.net/troncy/mediafinder-collect-enrich-and-visualize-media-memes-shared-by-the-crowd

[4] http://de.slideshare.net/huetbenoit/eventbased-summarization-for-media-hyperlinking-ebmip-2013-workshop-on-eventbased-media-integration-and-processing-colocated-with-acm-multimedia-2013-october-2122-barcelona-spain

[5] http://www.slideshare.net/PaulaUdondek/fiatifta-2013-television-linked-to-the-web-the-case-for-audiovisual-archives

2.7 Publications

The LinkedTV project has further demonstrated the value of its research and development work through peer reviewed publication of papers at conferences and other events.

Concrete results:

In the first 18 months, we reported 19 publications. In the subsequent 12 months, we list here **53 scientific publications** achieved by the LinkedTV partners.

1. T. Reuter, S. Papadopoulos, V. Mezaris, P. Cimiano, **ReSEED: Social Event dEtection Dataset**, Proc. 5th ACM Multimedia Systems Conference (MMSys'14), Singapore, March 2014.

2. L. Baltussen, L. Pérez Romero, L. Nyxon, L. Hardman. **Developing a second screen application for TV broadcasts enriched via Linked Open Data.** Poster session, European Data Forum, Athens, Greece, March 19-20, 2014.

3. Jan Thomsen, Raphaël Troncy and Lyndon Nixon. **Linking WebContent Seamlessly with Broadcast Television: Issues and Lessons Learned.** In 4th W3C Workshop on Web and TV, Munich, Germany, March 12-13, 2014.

4. Pérez Romero L., Baltussen L.,Van Leeuwen P., Hildebrand M., Hardman L., Nixon L., **Interaction Design and User Needs for TV Broadcasts Enriched with Linked Open Data** in VII International Workshop on Personalized Access to Cultural Heritage (PATCH 2014), Intelligent User Interfaces Conference, Haifa, Israel, February 24th, 2014.

5. F. Markatopoulou, V. Mezaris, I. Kompatsiaris, **"A Comparative Study on the Use of Multi-Label Classification Techniques for Concept-Based Video Indexing and Annotation"**, Proc. 20th Int. Conf. on MultiMedia Modeling (MMM'14), Dublin, Ireland, January 2014. Best Paper Award

6. A. Moumtzidou, K. Avgerinakis, E. Apostolidis, V. Aleksic, F. Markatopoulou, C. Papagiannopoulou, S. Vrochidis, V. Mezaris, R. Busch, I. Kompatsiaris, **"VERGE: An Interactive Search Engine for Browsing Video Collections"**, Proc. Video Browser Showdown (VBS'14) at the 20th Int. Conf. on MultiMedia Modeling (MMM'14), Dublin, Ireland, January 2014.

7. M. Sahuguet and B. Huet, **"Mining the web for multimedia-based enriching"**, MMM 2014, 20th International Conference on MultiMedia Modeling, 8-10th January 2014, Dublin, Ireland / Also published in LNCS.

8. L.B. Baltussen, R. Ordelman. **Future Media: LinkedTV en AXES**. In: S. Beekman, G. Freriks, M. Hakvoort, B. Meulenberg, B. Nieuwenhuijsen, M. Notebomer, E. Röling.*Trends en ontwikkelingen in crossmedia 2013-2014*. iMMovator Cross Media Network, January 2014. pp. 165

9. Xueliang Liu and Benoît Huet, **"Event representation and visualization from social media"**, PCM 2013, 14th Pacific-Rim Conference on Multimedia, 13-16 December 2013, Nanjing, China / Also published in LNCS.

10. F. Markatopoulou, A. Moumtzidou, C. Tzelepis, K. Avgerinakis, N. Gkalelis, S. Vrochidis, V. Mezaris, I. Kompatsiaris, **"ITI-CERTH participation to TRECVID 2013"**, Proc. TRECVID 2013 Workshop, Gaithersburg, MD, USA, November 2013.

11. Daniel Stein, Stefan Eickeler, Rolf Bardeli, Evlampios Apostolidis, Vasileios Mezaris, and Meinard Müller. **Think Before You Link — Meeting Content Constraints when Linking Television to the Web.** NEM Summit, 28-30 October 2013, Nantes, France.

12. Daniel Stein, Alp Öktem, Evlampios Apostolidis, Vasileios Mezaris, José Luis Redondo García, Raphaël Troncy, Mathilde Sahuguet, Benoit Huet. **From Raw Data to Semantically Enriched Hyperlinking: Recent Advances in the LinkedTV Analysis Workflow.** NEM Summit, 28-30 October 2013, Nantes, France.

13. Christos Tzelepis, Nikolaos Gkalelis, Vasileios Mezaris, I. Kompatsiaris, **"Improving event detection using related videos and Relevance Degree Support Vector Machines"**, Proc. ACM Multimedia 2013 (MM'13), Barcelona, Spain, 21 October 2013, to appear.

14. Mathilde Sahuguet, Benoit Huet. **Socially Motivated Multimedia Topic Timeline Summarization**. In Proceedings of SAM 2013, 2nd ACM International Workshop on Socially-Aware Multimedia, In conjunction with ACM Multimedia 2013, 21 October 2013, Barcelona, Spain

15. Mathilde Sahuguet, Benoit Huet, Barbora Červenková, Evlampios Apostolidis, Vasileios Mezaris, Daniel Stein, Stefan Eickeler, Jose Luis Redondo Garcia, Raphael Troncy, Lukas Pikora, **"LinkedTV at MediaEval 2013 Search and Hyperlinking Task"**, Working Notes in Proc. of the MediaEval 2013 Workshop, 18-19 October, 2013, Barcelona, Catalunya, Spain.

16. T. Reuter, S. Papadopoulos, G. Petkos, V. Mezaris, Y. Kompatsiaris, P. Cimiano, C. de Vries, S. Geva, **"Social Event Detection at MediaEval 2013: Challenges, Datasets, and Evaluation"**, Proc. MediaEval 2013 Workshop, CEUR vol. 1043, Barcelona, Spain, October 2013.

17. Pérez Romero, L., **LinkedTV News: designing a second screen companion for web-enriched news broadcasts**, PDEng Thesis, Eindhoven University of Technology, October 2013, ISBN: 978-90-444-1229-1

18. José Luis Redondo García, Raphaël Troncy. **Television meets the Web: a Multimedia Hypervideo Experience**. In ISWC 2013 Doctoral Consortium, Sydney, Australia.

19. Milan Dojchinovski, Tomáš Kliegr. **Datasets and GATE Evaluation Framework for Benchmarking Wikipedia-Based NER Systems**. In Proceedings of the DBpedia & NLP 2013 Workshop at ISWC 2013, Sydney, Australia.

20. Jaroslav Kuchař, Tomáš Kliegr. **GAIN: web service for user tracking and preference learning – a SMART TV use case** (system demo). In Proceedings of the 7th ACM Recommender Systems Conference (RecSys 2013), Hong Kong, China. October 2013.

21. Miroslav Vacura. **Ethical and Social aspects of Internet Search in Historical Perspective**. In Proceedings of IDIMT - Interdisciplinary Information and Management Talks 2013. Prague, Czech Republic. September 2013

22. Milan Dojchinovski, Tomáš Kliegr. **Entityclassifier.eu: Real-time Classification of Entities in Text with Wikipedia** . In ECML/PKDD (Demo paper), September 2013

23. Stanislav Vojíř, Tomáš Kliegr, Andrej Hazucha, Radek Škrabal, Milan Šimůnek. **Transforming Association Rules to Business Rules: EasyMiner meets Drools.** Rule-ML Challenge 2013. CEUR-WS paper. July 2013.

24. Miroslav Vacura. **Ethical and Social Aspects of Internet Search in Historical Perspective.** In IDIMT'13, September 2013, Trauner-Verlag.

25. Ivo Lašek, Peter Vojtáš. **Various Approaches to Text Representation for Named Entity Disambiguation**. In *International Journal of Web Information Systems*, Emerald, 2013.

26. Nikolaos Gkalelis, Vasileios Mezaris, Ioannis Kompatsiaris, Tania Stathaki, **"Video event recounting using mixture subclass discriminant analysis"**, Proc. IEEE International Conference on Image Processing (ICIP 2013), Melbourne, Australia, September 2013.

27. Panagiotis Sidiropoulos, Vasileios Mezaris, Ioannis Kompatsiaris, **"Enhancing video concept detection with the use of tomographs"**, Proc. IEEE International Conference on Image Processing (ICIP 2013), Melbourne, Australia, September 2013.

28. Jochen Schwenninger, Daniel Stein, Michael Stadtschnitzer: **Automatic Parameter Tuning and Extended Training Material: Recent Advances in the Fraunhofer Speech Recognition System**. Proc. Workshop Audiosignal- und Sprachverarbeitung, Koblenz, Germany, September 2013. 8 pages

29. Daniel Stein, Jochen Schwenninger, Michael Stadtschnitzer. **Improved Speed and Quality for Automatic Speech Recognition using Simultaneous Perturbation Stochastic Approximation** . Submitted to Interspeech 2013, August 2013, Lyon, France. 4 pages.

30. Thomas Steiner and Raphaël Troncy. **Tell me why! Ain't nothin' but a mistake? Describing Media Item Differences with Media Fragments URI and Speech Synthesis**. In *(ICME'13)* 1st International Workshop on Media Fragment Creation and Remixing (MMIX'13), July 15-19, San Jose, USA.

31. Evlampios Apostolidis, Vasileios Mezaris, Ioannis Kompatsiaris, **"Fast object re-detection and localization in video for spatio-temporal fragment creation"**, Proc. 1st Int. Workshop on Media Fragment Creation and reMIXing (MMIX'13) at the IEEE Int. Conf. on Multimedia and Expo (ICME 2013), San Jose, CA, USA, 15-19 July 2013.

32. Nikolaos Gkalelis, Vasileios Mezaris, Michail Dimopoulos, Ioannis Kompatsiaris, Tania Stathaki, **"Video event detection using a subclass recoding error-correcting output codes framework"**, Proc. IEEE Int. Conf. on Multimedia and Expo (ICME 2013), San Jose, CA, USA, 15-19 July 2013.

33. Lyndon Nixon. **Web and TV seamlessly interlinked: LinkedTV**. At INTETAIN 2013, Mons, Belgium, July 2013.

34. Julien Leroy, Francois Rocca, Matei Mancas, Bernard Gosselin, **3D Head Pose Estimation for TV setups**, Intetain2013: 5th International Conference on Intelligent Technologies for Interactive Entertainment, Mons, Belgium, 07/2013.

35. Lotte Belice Baltussen, Roeland Ordelman, Jaap Blom. **VideoHypE: An Editor Tool for Supervised Automatic Video Hyperlinking**. In 11th European Interactive TV Conference (EuroITV 2013), June 2013, Como, Italy.

36. Daniel Ockeloen,Kati Hyyppä, Pieter van Leeuwen. **Enriched Multiscreen TV Experience**. In 11th European Interactive TV Conference (EuroITV 2013), *Demo Track*, June 2013, Como, Italy

37. Ana Carina Palumbo, Lynda Hardman. **User Information Needs for Environmental Opinion-forming and Decision-making in Link-enriched Video**. In 11th European Interactive TV Conference (EuroITV 2013), June 2013, Como, Italy

38. Vuk Milicic, José Luis Redondo Garcia, Giuseppe Rizzo, Raphaël Troncy. **Grab your Favorite Video Fragment: Interact with a Kinect and Discover Enriched Hypervideo**. In European Interactive TV Conference (EuroITV'13), *Demo Track*, June 2013, Como, Italy.

39. Lilia Pérez Romero and Myriam C. Traub and Mieke H.R. Leyssen and Lynda Hardman, Second Screen Interactions for Automatically Web-enriched Broadcast Video. 4th International Workshop on Future Television (FutureTV 2013), June 2013, Como, Italy.

40. Katarina Stanoevska-Slabeva, Veselina Milanova. **Emerging Second Screen Value Networks: Insights for TV Broadcasters**. In 11th European Interactive TV Conference (EuroITV 2013), June 2013, Como, Italy

41. Lotte Belice Baltussen, Roeland Ordelman, Jaap Blom. **VideoHypE: An Editor Tool for Supervised Automatic Video Hyperlinking**. In 5th International Conference on Intelligent Technologies for Interactive Entertainment, July 2013, Mons, Belgium.

42. Vuk Milicic, José Luis Redondo Garcia, Giuseppe Rizzo, Raphaël Troncy. **Tracking and analyzing the 2013 Italian Election**. In 10th European Semantic Web Conference (ESWC'13), *Demos Track*, May 2013, Montpellier, France

43. Vuk Milicic, Giuseppe Rizzo, Josè Luis Redondo Garcia, Raphaël Troncy and Thomas Steiner. **Live Topic Generation from Event Streams**. In 22nd International World Wide Web Conference (WWW'13), *Demos Track*, Rio de Janeiro, Brazil, May 13-17, 2013.

44. Lyndon Nixon, Matthias Bauer and Cristian Bara. **Connected Media Experiences: Web based interactive video using Linked Data**. In 22nd International World Wide Web Conference (WWW'13), *Demos Track*, May 13-17, 2013, Rio de Janiero, Brazil.

45. Lyndon Nixon. **Linked Services Infrastructure: a single entry point for online media related to any Linked Data concept**. In 22nd International World Wide Web Conference (WWW'13), *Developers Track*, May 13-17, 2013, Rio de Janiero, Brazil.

46. Lyndon Nixon, Matthias Bauer and Cristian Bara. **Connected Media Experiences: Interactive video using Linked Data on the Web**. In the Linked Data on the Web workshop (LDOW2013) at 22nd International World Wide Web Conference (WWW'13), May 13-17, 2013, Rio de Janiero, Brazil.

47. Yunjia Li, Giuseppe Rizzo, Josè Luis Redondo Garcia and Raphaël Troncy. **Enriching Media Fragments with Named Entities for Video Classification**. In *(WWW'13)* 1st Worldwide Web Workshop on Linked Media (LiME'13), Rio de Janeiro, Brazil, May 13, 2013.

48. Julien Leroy, Francois Rocca, Matei Mancas, Bernard Gosselin, **Second screen interaction: an approach to infer TV watcher's interest using 3D head pose estimation**, First Worldwide Web Workshop on Linked Media (LiME-2013), Rio de Janeiro, Brazil, May 13-17 2013.

49. Michiel Hildebrand, Lynda Hardman. **Using Explicit Discourse Rules to Guide Video Enrichment**. In *(WWW'13)* 1st Worldwide Web Workshop on Linked Media (LiME'13), Rio de Janeiro, Brazil, May 13, 2013.

50. Marieke van Erp, Giuseppe Rizzo and Raphaël Troncy. **Learning with the Web: Spotting Named Entities on the intersection of NERD and Machine Learning**. In *(WWW'13)* 3rd International Workshop on Making Sense of Microposts (#MSM'13), Concept Extraction Challenge, Rio de Janeiro, Brazil, May 13, 2013.

51. Raphaël Troncy, Vuk Milicic, Giuseppe Rizzo and Josè Luis Redondo Garcia. **MediaFinder: Collect, Enrich and Visualize Media Memes Shared by the Crowd**. In *(WWW'13)* 2nd International Workshop on Real-Time Analysis and Mining of Social Streams (RAMSS'13), Rio de Janeiro, Brazil, May 14, 2013.

52. Sven Buschbeck, Anthony Jameson, Adrian Spirescu, Raphaël Troncy, Houda Khrouf, Osma Suominen and Eero Hyvönen. **Parallel Faceted Browsing**. In ACM SIGCHI Conference on Human Factors in Computing Systems (CHI'13) Interactivity Track, April 27-May 2nd, 2013, Paris, France.

53. Symeon Papadopoulos, Emmanouil Schinas, Vasileios Mezaris, Raphaël Troncy, Ioannis Kompatsiaris, **"The 2012 Social Event Detection Dataset"**, Proc. ACM Multimedia Systems 2013 (MMSys), Oslo, Norway, Feb.-March 2013.

2.8 Highlights from the dissemination

"We are pleased to inform about the great results LinkedTV has achieved at the MediaEval 2013 Search and Hyperlinking Task. which were unveiled at the MediaEval 2013 workshop and are now publicly available in the MediaEval 2013 proceedings.

LinkedTV partners EURECOM, UEP, CERTH-ITI and Fraunhofer IAIS collaborated to apply LinkedTV analysis and linking technologies to the BBC-sourced video corpus. As the results were published, LinkedTV found itself in:

- SECOND place in the Search sub-task;
- FIRST place in the Hyperlinking sub-task!

Thus the MediaEval activity has helped validate the value of LinkedTV analysis and linking technology on a large video corpus and is an encouragement to us for further refinements and improvements in the coming year. A big well done to the collaborators who spent a lot of time, also over the summer, to produce this winning result!"

(News item published at linkedtv.eu, November 18 2013)

2.9 Future plan for activities

In the next 12 months (to March 2015), some dissemination actions can already be identified.

Events being organized in 2014 by LinkedTV:

- we plan the fifth FutureTV workshop at ACM TVX 2014 (formerly EuroITV)), helping continue this series of events focused on the future of television (http://linkedtv.eu/event/futuretv2014)

- we plan a scientific workshop on "Linked Media" at the Extended Semantic Web Conference (ESWC) 2014 (http://linkedtv.eu/event/lime2014)

- we plan to propose a tutorial to the ISWC 2014 (deadline 23 April)

- we plan to make a LinkedTV demo during IFA 2014 (September)

- we have applied to receive an exhibition booth at the IBC 2014 (September)

- we will look for additional TV and media industry event participations in early 2015

3 Standardisation plan

Activities towards standardization of the project results will also be explored and coordinated in the Dissemination activity, so that LinkedTV may have the best possible impact both in the scientific and commercial communities. In terms of current standardization efforts, LinkedTV will actively participate in and contribute to various standardization bodies in activities of relevance to LinkedTV R&D activity. Furthermore, LinkedTV will seek to identify emerging new requirements in the project which are not (yet) covered by any known standardization activity, and where possible propose and chair new standardization activities.

We can consider current activities in a number of standardization bodies - often consortium partners are already participants in specific technical working groups within these bodies – with the expectation of having significant impact on their future development.

3.1 W3C

LinkedTV has presented a position paper at the W3C 4th Workshop on Web & TV (March 2014). The main topics identified by LinkedTV which need to be mapped to possible contributions or participations are:

- Timepoint alignment between a broadcast TV stream and a Web application
  - o ISSUE: Web browser implementation of MediaFragment URI specification of 'clock' parameter

- Abstract, consistent identification of a broadcast TV program across live, catch up and VoD delivery
  - o All channels could follow a similar approach to BBC Program Ontology for identifiers, using Linked Data principles to look up further program data.
  - o Insertion of program identifiers in DVB/EPG streams.

- Access to fuller program metadata by Web applications
  - o All channels publishing program metadata via API or LOD (a la BBC).
  - o Option: "Timed Annotation Track" defined in WebVTT

- Annotation of broadcast TV as part of the media workflow
  - o Introduction of Annotated Media Fragment support into productions standards and metadata exchange standards

- Media Fragment support on client devices like SmartTVs and STBs
  - o Issue: Being able to refer to and access a fragment of a broadcast TV stream like a Web A/V stream, also across applications/screens
  - o Incorporation of fragments into work on content synchronisation across screens (e.g. in W3C Second Screen Presentation Community Group)

- Content overlays to TV channel possible via SmartTV or STB
  - Requires appropriate HTML5 support on TV devices plus access to the TV screen as the "Web page"

A number of relevant Working Groups (WGs) – listed below - have LinkedTV representation, and based on this initial analysis of standardisation points (above) we will examine how best to input to and comment on ongoing standardisation activities in those groups.

3.1.1 Web & TV IG

- Homepage: http://www.w3.org/2011/webtv/ (see also the charter and the blog)
  - Media API TF: http://www.w3.org/2011/webtv/wiki/Media_APIs
    - Investigate how to expose TV metadata to web applications
    - Investigate mapping between Media Element API and in-band metadata
    - Synchronization of content between devices up to frame level
- Specifications:
  - Web Media Profile: version of 13/03/2012
  - Requirements for Home Networking Scenarios: version of 01/12/2011

A first iteration of Use Cases, Requirements, Gap Analysis and Recommendations (W3C Note is forthcoming) took place in 2013. The next iteration will begin soon with a request for further Use Cases.

3.1.2 Multilingual WG

- Homepage: http://www.w3.org/International/multilingualweb/lt/
- Specifications:
  - Internationalization Tag Set (ITS) Version 2.0:

    http://www.w3.org/International/multilingualweb/lt/drafts/its20/its20.html

  - This work includes the NERD ontology contributed by LinkedTV partner EURECOM

3.1.3 Annotation WG

- There will be an Annotation Working Group to be formed soon, pushing the Open Annotation Model to a full recommendation, giving to it an API for developers, etc.
- LinkedTV partner EURECOM will of course continue to participate and in particular give the LinkedTV experience in using the model.
- The preliminary draft charter is at http://www.w3.org/2014/01/Ann-charter.html

3.1.4 Second Screen Presentation Community Group

The group's goal is to define an API that allows web applications to use secondary screens to display Web content. For LinkedTV, this Web application could be running on the SmartTV, and using the tablet as the main screen for the enrichments, thus "reverse casting"!

The current approach is based around this Specification, which will be explored by LinkedTV in the hbbTV-based demo (see next section): http://webscreens.github.io/presentation-api/

From the LinkedTV W3C paper, some issues can be added to this approach:

- using Media Fragment URIs in references to content to be displayed on a screen, including broadcast TV content
- access to the broadcast tuner; HTML5 overlays over the TV content itself

3.2 hbbTV

LinkedTV plans to implement the Linked Television functionality in a HbbTV device (SmartTV) in order to demonstrate how Linked Television could be brought into the living room through established consumer electronics devices. Consideration of the workarounds needed in the current demo based on HbbTV 1.5 are compared to the potential solutions to those workarounds offered in the currently foreseen HbbTV 2.0 specification. A summary of this document will be submitted as a LinkedTV position paper to the HbbTV consortium, to demonstrate the need for HbbTV 2.0 functionality in new TV applications as well as to raise potential gaps for implementation in subsequent HbbTV updates.

The current prototype takes a fully Web-centric approach, so we will analyse the extent to which our use of Web technologies can be directly ported into the HbbTV environment and additionally the possibilities that HbbTV - now or in the future - can offer through direct API access to the television and to the companion screens. A hybrid prototype using HbbTV 1.5 on a current SmartTV will be prepared and shown at IFA 2014 (Berlin, September 2014). Parallel to this, we are identifying functionality gaps in the current HbbTV specification and are seeking to clarify if we can introduce those functionalities towards a "fully operative" LinkedTV over broadcast television once HbbTV 2.0 is defined or whether there are still open issues which we need to propose solutions for beyond the HbbTV 2.0 release.

The current LinkedTV prototype works like this:

(1) The "TV stream" is accessed on the first (main) screen via URL - in this case the "TV stream" is a recorded video streamed from a Web server via HTTP.

(2) The LinkedTV functionality - a display of concepts in the TV programme which link to related information about the concept from the Web - is accessed on any other (companion) screen via opening manually the same URL - the 'multi-screen toolkit' software on the server is able to manage the different screens that are connected and coordinate the content between them

(3) The server monitors the timepoint of the TV stream and sends updates to the companion screens. The Web application on the companion screen is largely independent of the main screen apart from video controls which allow the viewer to pause or skip on the main screen.

The planned LinkedTV prototype using HbbTV 1.5 is foreseen to work like this:

(1) A "TV stream" is accessed as a channel in the TV which is representing a broadcast stream such as RBB.

(2) A StreamEvent in this broadcast stream informs the HbbTV device of the availability of Linked Television functionality - concepts and enrichments for the coming TV program.

(3) A LinkedTV HbbTV app appears in the app menu for the TV program. If the viewer chooses this app, a QR code is displayed on screen.

(4) The viewer must use a QR reader app on their companion device and via reading the displayed QR code and their giving of permission, an URL is opened in the browser of the companion device.

(5) The 'multi-screen toolkit' on the server is managing the companion devices connecting via the provided URL and monitoring the broadcast stream that the URL is associated to. The identity of the TV program running on the broadcast stream is known to the server-side application (hardcoded).

(6) The toolkit manages the sending of updates to the companion screens based on the timepoint of the program in the broadcast stream (the prototype A/V stream will have well defined synchronisation points).

In the broadcast TV scenario, the video stream is no longer a single, referenceable URL and the timeline is not a single, finite temporal period. Let us consider how we could foresee a fully integrated LinkedTV service in HbbTV-enabled interactive television based on HbbTV 2.x:

(1) A "TV stream" is accessed as a channel in the TV which is representing a broadcast stream such as RBB.

(2) The DVB Application Information Table (AIT) in this broadcast stream informs the HbbTV device of the availability of Linked Television functionality - concepts and enrichments for the coming TV program.

(3)

   a. A LinkedTV HbbTV app appears in the app menu for the TV program. If the viewer chooses this app, the HbbTV device **searches for companion devices on the home network** and **sends a permissions request to use a**

companion device screen. The user of the companion device must agree to connect to the LinkedTV app.

b. Alternative: the app uses part of the main screen for display so **it needs to request main screen space** alongside a frame for the broadcast TV content.

(4)

a. As the TV program runs, the LinkedTV app registers for and now **receives annotation data for the current program in the broadcast stream or in a parallel broadband connection** - in LinkedTV, this is indications of concepts in the program and associated links to related Web content for each concept. It could be polled from the client to the LinkedTV Platform via IP but, in a broadcast environment, there is the option to "pull" the data that is sent continually over the wire, **cached for the time of activity** and then deleted. e.g. this could be a specialised data track delivered as a Timed Text track in the broadcast stream. The app sends updates to the display areas (screen independent) for new concepts or when concepts are inactive; it includes the interactivity to allow viewers to browse and open related links for a concept, supporting different interaction modalities as appropriate (on the TV it could be remote control, voice, gesture. On companion devices it is most likely touch.)

b. Alternative: the app uses part of the main screen to display the concepts in the current TV program and maybe even display certain types of related information alongside the TV program, thus the app needs HTML/CSS presentation layer capabilities to organise and display different types of Web content alongside the broadcast TV display and intercept events for this presentation layer from different types of interaction modality.

c. Hybrid: the app can use a part of the main screen to show the currently active concepts, and on viewer interaction with a concept, show the related content via a Web link to a companion screen. This requires that the companion screen is already connected as per step (3).

(5) As the program ends, or the LinkedTV app is switched off by the viewer, connections to companion screens need to be closed or display areas on the main screen removed. The system is not to lose resources waiting on annotations which no longer come, so the app needs to unregister itself from the additional data stream or be unregistered automatically when the program ends (we presume there is an End of Program marker in broadcast that the app can be aware of).

The above is based on the simulation of a live broadcast stream, whereas a similar functionality should also be supported in the case of catch-up TV or Video on Demand (VoD) where the programming is a recorded A/V stream delivered via broadband IP. Since DVB

AIT is not available when choosing an Internet video **there needs to be another HbbTV trigger to indicate this video can be enriched by LinkedTV**, otherwise LinkedTV support of such material will only be possible if the material is selected using the LinkedTV app. Then the system runs like above, steps (3)-(5), except that there is no 'pull' of LinkedTV data, rather **the app needs to access an identification of the video stream and its timeline**, so that it can then poll the LinkedTV platform for any annotations and enrichments of that content.