Deliverable 7.7 Dissemination and Standardisation Report v3

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Abstract (for dissemination)	*This deliverable presents the LinkedTV dissemination and standardisation report for the project period of months 31 to 42 (April 2014 to March 2015).*

[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))

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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 project's 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 31 until month 42 (April 2014 to March 2015), 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.

Since this deliverable covers the final period of the project, we close with a note on ensuring sustainability of project results which have been or are being disseminated.

1.1 History of the document

Table 1: History of the document

Date	Version	Name	Comment
02.03.15	V0.5	Lyndon Nixon	Created initial structure and content of deliverable (based on partners existing inputs)
17.03.15	V0.75	Lyndon Nixon and all	Included all partners inputs on their dissemination actions
27.03.15	V0.9	Lyndon Nixon and all	Updated all partner inputs and completed document with summaries and conclusions
30.03.15	V0.95	Lyndon Nixon	Post-QA corrections, updated PR materials with updated materials to end of project
31.03.15	V1.0	Raphael Troncy, Lyndon Nixon	Inclusion of W3C event report by Raphael Troncy (EURECOM), final check and completion by Lyndon Nixon

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 AND showcase.linkedtv.eu
- Social Web channels, e.g. Twitter, Slideshare, YouTube/Vimeo
- PR materials about the project: leaflets/flyers, brochures, posters, videos/films
- Participation at conferences and at major industry events
- Organisation of academic and industry events (e.g. workshops, info days)
- Publications in scientific / trade journals; press releases

2.1 LinkedTV website

Figure 1: The LinkedTV website front page

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

Concrete results:

- **News items**. In the period April 2014 to March 2015 we published 45 news items. Each news item has its own URL, categories and tags (Figure 2), and can be directly liked, recommended (via Facebook) or commented upon.

Figure 2: News items tag cloud

- **Website sections**. The site content has been completed to the status at the end of the project, e.g. updated lists of LinkedTV Demos, Tools & Services, publications, presentations, events, deliverables and the final newsletter. This is complemented by ensuring that the separate pages for each research, development and scenario activity reflect the outcome of that activity at project end. For the main commercialisable services – platform, editor tool, player and showcase demonstrators – links are highlighted to the respective showcase.linkedtv.eu pages.
- **Online visibility, e.g. Search Engine Optimisation (SEO)**. In the period April 2014 to end March 2015 the website has had a total of 8,027 visits, 5,679 unique visitors and 14,415 page impressions. There was an average of 1.8 pages seen at each visit, an average visit duration of 1 min 32 sec, and 69.02% of visits were new. This compares similarly with the figures from the previous 12 months: there was a slightly higher percentage of new visits (60% in the previous year). 10% of visitors came from the US, indicating particular interest from across the pond. 45% of visitors came via a search engine (organic results), while a significant change was 23% of visitors referred from another site (9% the previous year). It became clear that LinkedTV presence at different events had played a big role in attracting new visitors, with most of the top 10 referral sites being conferences or industry events, the rest being 2 consortium partner websites.

2.2 Social Web channels

LinkedTV has a RSS feed at www.linkedtv.eu/feed/ and a Twitter stream at twitter.com/linkedtv. We have shared video material on a YouTube channel at https://youtube.com/user/LinkedTVeu, and switched to now use Vimeo at

https://vimeo.com/user32346380, and presentations using SlideShare at http://slideshare.net/linkedtv.

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 248 tweets to date (91 in the past 12 months) and has now 220 followers (50% up on 12 months ago). We are also increasingly mentioned by other accounts or our tweets are retweeted.
- **Distribute videos via YouTube and Vimeo.** The YouTube channel contains 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 has had total 2 410 views with the Shot Segmentation Demo and LinkedTV Hyperlinked Documentary Demo being the most popular videos. This year we began using Vimeo, and have uploaded 8 videos to our channel: we have a total 470 plays to date (with the first video uploaded 6 months ago). Both channels will remain 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 67 shares (nearly double from a year ago) and 104 followers. There are 32 presentations, where the second year update to the LinkedTV introduction (uploaded 16 months ago) has now gathered 23,300 views. There are 35 documents: the 2 newsletters, poster and 32 deliverables. D1.1 State of the Art for Hypervideo has remained our most popular document, with 4,272 views to date. The documents will be updated after the project with all final public deliverables of the project.

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.

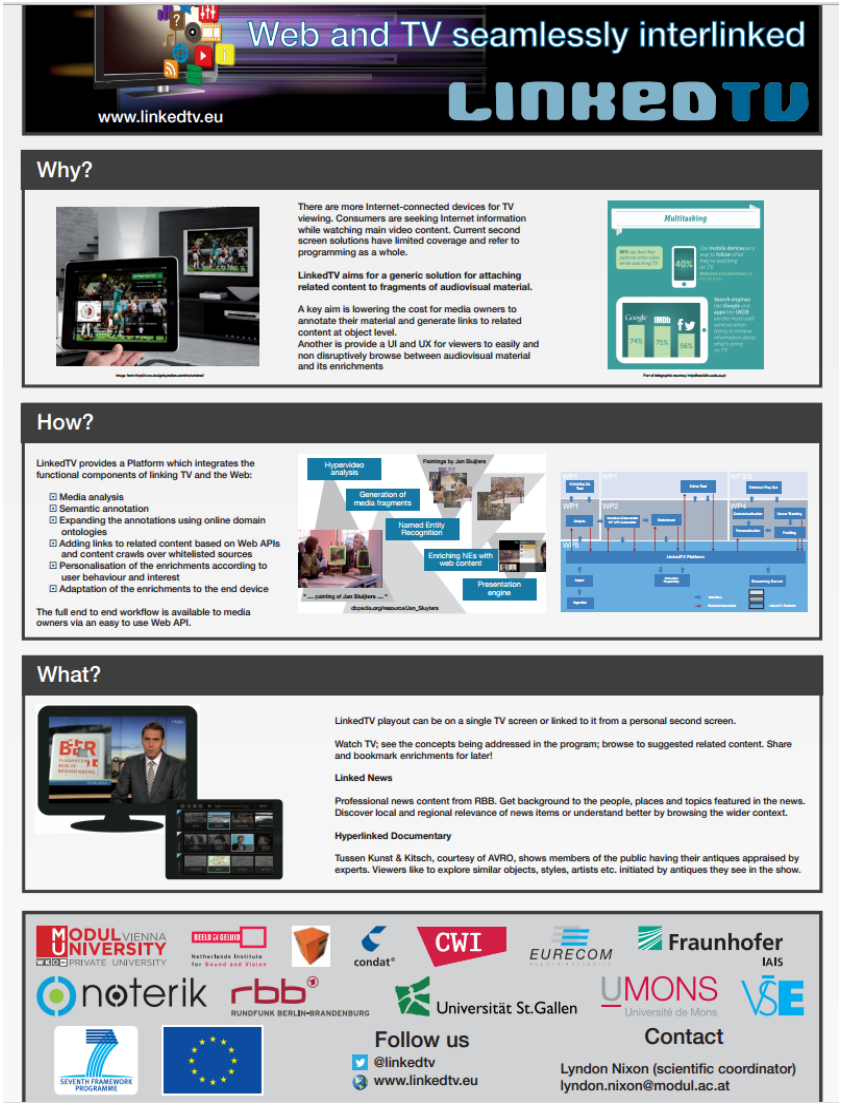

Figure 3: The LinkedTV Poster

- **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 that LinkedTV organized or participated in (see sections 2.4, 2.5 and 2.6).
- **Produce a project newsletter.** In closing the project the 8-page newsletter was updated to properly reflect the state of the project results at project end. A print run was made before project end so that all partners could acquire copies of the newsletter to distribute at events after the project. 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 that LinkedTV organized or participated in (see sections 2.4 and 2.5).
- **Produce a project flyer.** With a view for dissemination for exploitation of LinkedTV in future events, a flyer has also been created at A5 size which highlights the LinkedTV "offer" to media-owning organisations and points interested people to

http://showcase.linkedtv.eu as well as providing a contact point for doing business with LinkedTV.

- **Produce other materials.** At IBC 2014 we printed and distributed LinkedTV stress cubes and LinkedTV mobile screen wipes, both featuring prominently the LinkedTV logo, name and Showcases page URL http://showcase.linkedtv.eu. These items were very popular and suggested a good choice also for partner's future dissemination efforts.

2.4 Events

The LinkedTV project has attended and participated in conferences and events covering topics relevant to the project because it was (co-) organizing the event or a part of the event or because it was invited to participate as a known expert in the field. Partners have also published scientific work at events and made presentations - this is reported in the following section 2.5.

- Speakers at the MediaMixer tutorial on Mixing Media on the Web at WWW2014 Conference, Seoul, Korea, April 2014
- Organizer of the Micropost NEEL challenge in the WWW2014 Conference, Seoul, Korea, April 2014
- Participants in the SNOW challenge in the WWW2014 Conference, Seoul, Korea, April 2014
- LinkedTV exhibition stand at IBC 2014, Amsterdam, September 2014
- Presentation at EUScreenXL 2014 conference, Rome, September 2014
- Presentation at Cross Media Café "Uit het lab", Amsterdam, November 2014
- Invited Talk at the D-Werft conference, Potsdam, Germany, November 2014
- Participation in the NewsReader hackathon, Amsterdam, January 2015
- Ignite Talk at EuropeanaTech 2015, Paris, France, February 2015

The following are future events, which are continuations of LinkedTV activities and thus can be mentioned here since we will show and disseminate material about LinkedTV there (but participation can not and will not be supported by LinkedTV, of course):

- 3rd International Workshop on Linked Media - co-organisation by LinkedTV partners – at the WWW2015 Conference, Florence, Italy, May 2015
- Named Entity rEcognition and Linking (NEEL) - co-organisation by LinkedTV partners – at the WWW2015 Conference, Florence, Italy, May 2015

2.5 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:

For the past 12 months and for the period after the project (i.e. submitted but not yet presented), we list here **51 scientific publications** achieved by the LinkedTV partners.

1. M. Dojchinovski, I. Lašek, T. Kliegr, O. Zamazal. **Entityclassifier.eu and SemiTags: Entity Discovery, Linking and Classification with Wikipedia and DBpedia**. In *Proceedings of the NIST Text Analytics Conference 2014*, Gaithersburg, Maryland, USA, 2015 (to appear).
2. Roeland J.F. Ordelman, Maria Eskevich, Robin Aly, Benoit Huet and Gareth J.F. Jones. **Defining and Evaluating Video Hyperlinking for Navigating**, Proc. 3rd International Workshop on Linked Media (LiME'15), Florence, Italy, May 2015.
3. R. Usbeck, M. Röder, A. Ngonga Ngomo, C. Baron, A. Both, M. Brummer, D. Ceccarelli, M. Cornolti, D. Cherix, B. Eickmann, P. Ferragina, C. Lemke, A. Moro, R. Navigli, F. Piccinno, G. Rizzo, H. Sack, R. Speck, R. Troncy, J. Waitelonis, L. Weseman. **GERBIL -- General Entity Annotator Benchmarking Framework**, Proc. 24th Int. World Wide Web Conference (WWW'15), Florence, Italy, May 2015
4. Lyndon Nixon, Lotte Baltussen and Johan Oomen. **LinkedCulture: browsing related Europeana objects while watching a cultural heritage TV program**. In Personalised Access to Cultural Heritage (PATCH) workshop, co-located with the International User Interfaces Conference (IUI 2015), Atlanta, USA, March 2015.
5. Leon Derczynski, Diana Maynard, Giuseppe Rizzo, Marieke van Erp, Genevieve Gorrell, Raphaël Troncy, Johann Petrak and Kalina Bontcheva. **Analysis of Named Entity Recognition and Linking for Tweets**. In Information Processing & Management, vol. 51 n. 2, pp. 32-49, 2015
6. F. Markatopoulou, N. Pittaras, O. Papadopoulou, V. Mezaris, I. Patras, **"A Study on the Use of a Binary Local Descriptor and Color Extensions of Local Descriptors for Video Concept Detection"**, Proc. 21st Int. Conf. on MultiMedia Modeling (MMM'15), Sydney, Australia, Jan. 2015.
7. A. Moumtzidou, K. Avgerinakis, E. Apostolidis, F. Markatopoulou, K. Apostolidis, T. Mironidis, S. Vrochidis, V. Mezaris, Y. Kompatsiaris, I. Patras, **"VERGE: A Multimodal Interactive Video Search Engine"**, Proc. 21st Int. Conf. on MultiMedia Modeling (MMM'15), Sydney, Australia, Jan. 2015.
8. Tomáš Kliegr. **Linked Hypernyms: Enriching DBpedia with Targeted Hypernym Discovery**. *Journal of Web Semantics*, Elsevier. Accepted.
9. N. Gkalelis, F. Markatopoulou, A. Moumtzidou, D. Galanopoulos, K. Avgerinakis, N. Pittaras, S. Vrochidis, V. Mezaris, I. Kompatsiaris, I. Patras, **"ITI-CERTH participation to TRECVID 2014"**, Proc. TRECVID 2014 Workshop, Orlando, FL, USA, Nov. 2014.
10. Vasileios Mezaris and Benoit Huet, **Video hyperlinking**, MM 2014, 22nd ACM International Conference on Multimedia, November 3-7, 2014, Orlanndo, Florida, USA.
11. Xueliang Liu and Benoit Huet, **Linking socially contributed media with events**, Multimedia Systems, November 2014, ISSN: 0942-4962
12. Evlampios Apostolidis, Vasileios Mezaris, Mathilde Sahuguet, Benoit Huet, Barbora Cervenková, Daniel Stein, Stefan Eickeler, José Luis Redondo Garcia, Raphaël Troncy, Lukas Pikora, **Automatic fine-grained hyperlinking of videos within a closed collection using scene**

segmentation, ACMMM 2014, 22nd ACM International Conference on Multimedia, November 3-7, 2014, Orlando, Florida, USA.

13. C. Papagiannopoulou, V. Mezaris, **"Concept-based image clustering and summarization of event-related image collections"**, Proc. 1st ACM Workshop on Human Centered Event Understanding from Multimedia (HuEvent'14) at ACM Multimedia (MM'14), Orlando, FL, US, Nov. 2014.
14. Bahjat Safadi, Mathilde Sahuguet, Benoit Huet, **Linking text and visual concepts semantically for cross modal multimedia search**, ICIP 2014, 21st IEEE International Conference on Image Processing, October 27-30, 2014, Paris, France.
15. E. Mavridaki, V. Mezaris, **"No-Reference blur assessment in natural images using Fourier transform and spatial pyramids"**, Proc. IEEE Int. Conf. on Image Processing (ICIP 2014), Paris, France, Oct. 2014.
16. José Luis Redondo Garcia, Mariela Sabatino, Pasquale Lisena and Raphaël Troncy. **Finding and sharing hot spots in Web Videos**. 13th International Semantic Web Conference (ISWC'14), Demo Track, Riva del Garda, Italy, October 2014.
17. Giuseppe Rizzo, Marieke van Erp and Raphaël Troncy. **Inductive Entity Typing Alignment**. 1st International Workshop on Linked Data for Information Extraction (LD4IE'14), Riva del Garda, Italy, October 2014.
18. H.A. Le, Q.M. Bui, B. Huet, B. Cervenková, J. Bouchner, E. Apostolidis, F. Markatopoulou, A. Pournaras, V. Mezaris, D. Stein, S. Eickeler, M. Stadtschnitzer, **LinkedTV at MediaEval 2014 search and hyperlinking task**, MEDIAEVAL 2014, MediaEval Benchmarking Initiative for Multimedia Evaluation Workshop, October 16-17, 2014, Barcelona, Spain.
19. K. Apostolidis, C. Papagiannopoulou, V. Mezaris, **"CERTH at MediaEval 2014 Synchronization of Multi-User Event Media Task"**, Proc. MediaEval 2014 Workshop, CEUR vol. 1263, Barcelona, Spain, Oct. 2014.
20. G. Petkos, S. Papadopoulos, V. Mezaris, Y. Kompatsiaris, **"Social Event Detection at MediaEval 2014: Challenges, Datasets, and Evaluation"**, Proc. MediaEval 2014 Workshop, CEUR vol. 1263, Barcelona, Spain, Oct. 2014.
21. J. Kuchař, T. Kliegr, **Bag-of-Entities text representation for client-side (video) recommender systems**. In First Workshop on Recommender Systems for Television and online Video (RecSysTV), ACM RecSys 2014 Foster City, Silicon Valley, USA, 6th-10th October 2014
22. Michael Stadtschnitzer, Christoph Schmidt, Daniel Stein. **Towards a Localised German Automatic Speech Recognition**. 11. ITG Fachtagung Sprachkommunikation, Erlangen, Germany, 24th-26th September 2014
23. J. Kuchař, T. Kliegr, **InBeat: Recommender System as a Service**. Working Notes for CLEF 2014 Conference, Sheffield, UK, September 15-18, 2014, 837-844
24. T. Kliegr, J. Kuchař, D. Sottara, S. Vojíř, **Learning Business Rules with Association Rule Classifiers**. In *International Web Rule Symposium 2014 (RuleML 2014)*, Prague, Czech Republic, August 2014
25. T. Kliegr, J. Kuchař **Orwellian Eye - Video recommendation with Microsoft Kinect**. In *Conference on Prestigious Applications of Intelligent Systems (PAIS'14) collocated with European Conference on Artificial Intelligence*, Prague, Czech Republic, August 2014, IOS Press
26. P. Sidiropoulos, V. Mezaris, I. Kompatsiaris, **"Video tomographs and a base detector selection strategy for improving large-scale video concept detection"**, IEEE Transactions on Circuits and Systems for Video Technology, vol. 24, no. 7, pp. 1251-1264, July 2014.
27. Nikolaos Gkalelis, Vasileios Mezaris, Michail Dimopoulos, Ioannis Kompatsiaris, **"Video Event Understanding**", Encyclopedia of Information Science and Technology, IGI Global, 2014.

28. Evlampios Apostolidis, Panagiotis Sidiropoulos, Vasileios Mezaris, Ioannis Kompatsiaris, **"Visual Information Analysis for Interactive TV applications"**, Encyclopedia of Information Science and Technology, IGI Global, 2014.
29. Dorothea Tsatsou, Matei Mancas, Jaroslav Kuchař, Lyndon Nixon, Miroslav Vacura, Juliens Leroy, François Rocca, Vasileios Mezaris. **When TV meets the Web: towards personalised digital media**. In *Semantic Multimedia Analysis and Processing*, Evangelos Spyrou, Dimitrios Iakovidis, Phivos Mylonas (Eds.). Crc Pr I Llc, July 2014. ISBN 978-1-4665-7549-3.
30. Lilia Perez Romero, Michiel Hildebrand, José Luis Redondo Garcia and Lynda Hardman. **LinkedTV News: A dual mode second screen companion for web-enriched news broadcasts**. ACM International Conference on Interactive Experiences for Television & Online Video (TVX), Newcastle University, UK , June 2014.
31. L. Nixon, V. Mezaris, J. Thomsen, **"Seamlessly interlinking TV and Web content to enable Linked Television"**, ACM Int. Conf. on Interactive Experiences for Television and Online Video (TVX 2014), Adjunct Proc., Newcastle Upon Tyne, UK, June 2014.
32. Lyndon Nixon and Raphaël Troncy. **LinkedTV: Web and TV seamlessly interlinked using semantic technology**. 11th Extended Semantic Web Conference (ESWC'14), EU Project Networking Track, Anissaras, Crete, May 2014.
33. José Luis Redondo García, Michiel Hildebrand, Lilia Perez Romero and Raphaël Troncy. **Augmenting TV Newscasts via Entity Expansion**. 11th Extended Semantic Web Conference - Posters and Demos Track, Anissaras, Crete, May 2014.
34. Lyndon Nixon, Lotte Belice Baltussen, Lilia Perez Romero and Lynda Hardman. **A companion screen application for TV broadcasts annotated with Linked Open Data**. 11th Extended Semantic Web Conference - Posters and Demos Track, Anissaras, Crete, May 2014.
35. Ahmad Assaf, Ghislain Atemezing, Raphael Troncy and Elena Cabrio. **What are the Important Properties of an Entity? Comparing Users and Knowledge Graph Point of View**. 11th Extended Semantic Web Conference - Posters and Demos Track, Anissaras, Crete, May 2014.
36. Dorothea Tsatsou and Vasileios Mezaris. **LUMO: The LinkedTV User Model Ontology**. 11th Extended Semantic Web Conference - Posters and Demos Track, Anissaras, Crete, May 2014.
37. Dorothea Tsatsou, Stamatia Dasiopoulou, Ioannis Kompatsiaris and Vasileios Mezaris. **LiFR: A Lightweight Fuzzy DL Reasoner**. 11th Extended Semantic Web Conference - Posters and Demos Track, Anissaras, Crete, May 2014.
38. Lyndon Nixon and Raphaël Troncy. **Survey of Semantic Media Annotation Tools for the Web: Towards new Media Applications with Linked Media**. 2nd International Workshop on Linked Media (LiME'14), Anissaras, Crete, May 2014.
39. Yunjia Li, Raphaël Troncy, Mike Wald and Gary Wills. '**Media Fragments Indexing using Social Media**. 2nd International Workshop on Linked Media (LiME'14), Anissaras, Crete, May 2014.
40. T. Kliegr, V. Zeman, M. Dojchinovski. **Linked Hypernyms Dataset - Generation Framework and Use Cases**. In *Linguistic Linked Data Challenge collocated with LREC 2014*, Reykjavik, Iceland, May, 2014.
41. Giuseppe Rizzo, Marieke van Erp and Raphaël Troncy. **Benchmarking the Extraction and Disambiguation of Named Entities on the Semantic Web**. In *9th International Language Resources and Evaluation Conference (LREC'14)*, Reykjavik, Iceland, May, 2014.
42. M. Stadtschnitzer, J. Schwenninger, D. Stein and J. Köhler. **Exploiting the large-scale German Broadcast Corpus to boost the Fraunhofer IAIS Speech Recognition System**. In *9th International Language Resources and Evaluation Conference (LREC'14)*, Reykjavik, Iceland, May, 2014.

43. T. Kliegr., O. Zamazal **Towards Linked Hypernyms Dataset 2.0: complementing DBpedia with hypernym discovery**. In *9th International Language Resources and Evaluation Conference (LREC'14)*, Reykjavik, Iceland, May, 2014.
44. E. Apostolidis, V. Mezaris. **Fast Shot Segmentation Combining Global and Local Visual Descriptors**. In IEEE Int. Conf. on Acoustics, Speech and Signal Processing (ICASSP), Florence, Italy, May 2014.
45. T. Ngyuen, D. Stein, M. Stadtschnitzer. **Gradient-free Decoding Parameter Optimization on Automatic Speech Recognition**. In IEEE Int. Conf. on Acoustics, Speech and Signal Processing (ICASSP), Florence, Italy, May 2014.
46. José Luis Redondo García, Laurens De Vocht, Raphaël Troncy, Erik Mannens and Rik Van de Walle. **Describing and Contextualizing Events in TV News Show**. In *2nd International Workshop on Social News on the Web (SNOW'14)*, Seoul, South Korea, April 7, 2014.
47. Carlo Andrea Conte, Raphaël Troncy and Mor Naaman. **Extracting Resources that Help Tell Events' Stories**. In *1st International Workshop on Social Multimedia and Storytelling (SoMuS'14)*, Glasgow, Scotland, April 1, 2014.
48. Benoit Huet, **Event-centric hyperlinking of socially contributed multimedia content**. In *1st International Workshop on Social Multimedia and Storytelling (SoMuS'14)*, Glasgow, Scotland, April 1, 2014.
49. Vasileios Mezaris, Georgios Petkos, Symeon Papadopoulos, Raphaël Troncy, Philipp Cimiano, Timo Reuter and Yiannis Kompatsiaris. Social Event Detection at MediaEval: a 3-year retrospect of tasks and results. In *1st International Workshop on Social Events in Web Multimedia (SEWM'14)*, Glasgow, Scotland, April 1, 2014.
50. N. Gkalelis, V. Mezaris, **Video event detection using generalized subclass discriminant analysis and linear support vector machines**, Proc. ACM Int. Conf. on Multimedia Retrieval (ICMR), Glasgow, UK, April 2014.
51. Bahjat Safadi, Mathilde Sahuguet, Benoit Huet, **When textual and visual information join forces for multimedia retrieval**, ICMR 2014, ACM International Conference on Multimedia Retrieval, April 1-4, 2014, Glasgow, Scotland

2.6 Highlights from the dissemination

LinkedTV also participated in significant international benchmarking activities:

TRECVID 2014

LinkedTV partner CERTH participated this year to the Semantic Indexing (SIN), Multimedia Event Detection (MED) and Multimedia Event Recounting (MER) tasks of the TRECVID International Benchmarking Activity. Significantly improved results were attained, compared to last year's participation to the same tasks, verifying the significance of the work carried out in LinkedTV for solving hard video analysis problems. One of the highlights of LinkedTV's participation was the new, very fast machine learning method for big data problems that CERTH developed. Tested in large-scale multimedia event detection problems, this new method produces better results than both Kernel- and Linear-SVMs, while its training is one or two orders of magnitude faster than Linear-SVMs (and even more so compared to Kernel-SVMs). The use of this new approach in the Multimedia Event Detection problem was highlighted with an oral presentation at the TRECVID Workshop.

MediaEval 2014

LinkedTV took part for the second time in the MediaEval Search and Hyperlinking task. The methodology developed by project partners produced interesting results, which confirmed that LinkedTV Hyperlinking technologies are strong performers.

In MediaEval 2014, LinkedTV in collaboration with other research projects also supported the organization of the "Social Event Detection in Web Multimedia" (SED) task, and participated to the "Synchronization of Multi-user Event Media" (SEM) task, confirming in practice the project's commitment to the evaluation of multimedia analysis and organization technologies through open benchmarking initiatives.

Two different tutorials were held by LinkedTV in two different locations: Tutorial on Video Hyperlinking at IEEE ICIP 2014 and ACM Multimedia 2014. LinkedTV presented its tutorial on Video Hyperlinking at the IEEE International Conference on Image Processing (ICIP) held in Paris this year (27-30th Oct 2014) as well as ACM Multimedia Conference held in Orlando, Florida (USA) (3rd-7th Nov 2014). The 3 hour Video Hyperlinking tutorial covered the topics of video analysis and hyperlink generation, building on the work carried out in LinkedTV's work on those topics led by partners CERTH and EURECOM. Both tutorials were well attended and led to extensive discussion with the audience.

Tutorial on Remixing Media on the Web at WWW 2014 and ISWC 2014. During both the World Wide Web Conference 2014 and the International Semantic Web Conference 2014 (ISWC2014) this October 2014, LinkedTV delivered a half day tutorial entitled “Remixing media on the (semantic) Web”. This tutorial looked at tools and services to semantically annotate online media and use those annotations for online retrieval and re-use based on a number of emerging web specifications and technologies. We focused on means to annotate spatial and temporal fragments of media assets with Linked Data concepts, how to use those annotations to discover types of relevancy between distinct media assets and development of applications using discovered links between annotated media to provide enhanced user services. In both events we were pleased to identify people from the media industry and broadcasters’ R&D departments in the audience.

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 actively participates in and contributes to various standardization bodies in activities of relevance to LinkedTV R&D activity: MPEG, W3C and HbbTV. Furthermore, in the media analysis area, a patent application is planned.

3.1 Media Analysis: MPEG and patenting

3.1.1 Standardization - MPEG

CERTH participated in the 111th MPEG meeting, which was held in Geneva, Switzerland, in February 2015, hosted at the headquarters of the ITU (International Telecommunication Union). During the meeting, CERTH had the opportunity to disseminate the LinkedTV results to members of the MPEG community. There are two sub-communities currently active in MPEG that are of particular interest to LinkedTV and could be targeted for promoting the standardization of LinkedTV technologies: the ad-hoc groups (AHG) on Media Linking Application Format (MLAF), and on Compact Descriptors for Visual Search / Compact Descriptors for Video Analysis (CDVS/CDVA). CERTH plans to continue monitoring the standardization activities that are carried out in MPEG and particularly in the above ad-hoc groups, for the purpose of identifying opportunities for influencing their standardization output.

3.1.2 Patent application

In accordance with CERTH's policy to protect the IPR of selected technologies that it develops, and also with CERTH-LinkedTV team's previously expressed intention to protect the latest version of the fast discriminant analysis method that it has developed and uses for video annotation, CERTH proceeded with the submission of a patent application for this technology during the last month of the project. The application was submitted to the Greek Patent Office, in order to secure an early submission date; this submission entitles CERTH to a one-year international priority for subsequent submission to EPO or the patent offices of other countries that are covered by the Paris Convention for the Protection of Industrial Property. Subsequent submission to EPO will be considered depending on the first feedback that we will receive from the Greek Patent Office and on the prospects for the commercial exploitation of this technique, which should become clearer in the coming months. This step-by-step approach is necessary not only for securing an early submission date but also for financial reasons, since both the submission and the yearly renewal fees for EPO patents are much higher that the corresponding fees charged by the Greek Patent Office.

3.2 W3C

The W3C is actively exploring Web standards for the TV world as SmartTVs and HbbTV move towards more complete HTML5 support in their browsers and openness to allow Web applications alongside their native applications. We expect the long existing gap between Web and TV standards to make way to pragmatic uptake of Web specifications inside TV environments in the next years, as manufacturers recognise the value of making TV and companion screen app development possible for the large number of existing Web developers is greater than the insistence on their own proprietary APIs and specifications.

Here, LinkedTV is well positioned with a metadata model for TV programming based on the Open Annotation Model being now supported through to final specification as the ”Web Annotation Data Model” in the W3C Annotation Working Group. On the client side, whether a Web model for content sharing and synchronisation between Web-connected devices, despite making a lot of sense as a device and platform independent approach, as driven now by the Second Screen Presentation working group, will be taken up in the broadcast TV industry has been made doubtful for now due to HbbTV 2.0 following a separate DVB specification for Companion Screens. It will take some more years for different efforts around second screen and multi-screen applications to converge on a common model for discovery and synchronisation, underlying the development in LinkedTV of the Multiscreen Toolkit, which provides a specification-independent implementation of this for multiscreen applications.

3.2.1 Web & TV Interest Group

The Web & TV Interest Group (http://www.w3.org/2011/webtv/) provides a forum for Web and TV technical discussions, to review existing work, as well as the relationship between services on the Web and TV services, and to identify requirements and potential solutions to ensure that the Web will function well with TV. There are 173 different participants from 64 different organizations participating in this group. EURECOM participated on behalf of the LinkedTV consortium and attended the most recent W3C Technical Plenary meeting in November 2014 to further work on aligning Global and Regional Web & TV Standards:

- IG Introduction (Giuseppe Pasquale, Opera): slides at http://www.w3.org/2014/10/tv-ig-meeting/Pascale_web_tv_ig_overview-20141027.pptx
- ATSC 3.0 update (Giridhar Mandyam, Qualcomm): slides at http://www.w3.org/2014/10/tv-ig-meeting/ATSC%203.0%20Update.pdf
- DLNA update (Mark Vickers, Comcast): slides at http://www.w3.org/2014/10/tv-ig-meeting/2014-10-26%20DLNA%20VidiPath.pdf
- HbbTV 2.0 (Giuseppe Pasquale, Opera): slides at http://www.w3.org/2014/10/tv-ig-meeting/TPAC%20-%20HbbTV%20Overview%20-%20Giuseppe%20Pascale.pdf
- Hybridcast 2.0 (Hisayuki Ohmata and Kinji Matsumura, NHK): slides at http://www.w3.org/2014/10/tv-ig-meeting/20141027_W3C_Hybridcast20.pdf
- TTAK.KO-07.0111/R1 - HTML5 Based Smart TV Platform (Donghoon Lee, Korea): slides at http://hiden95.github.io/TPAC2014/

This interest group has also given birth to a number of specialized groups, namely the TV Control API Community Group (https://www.w3.org/community/tvapi/), the Second Screen Presentation Community Group (https://www.w3.org/community/webscreens/) and finally, the Second Screen Presentation Working Group (http://www.w3.org/2014/secondscreen/). There are also a myriad of other working groups connected under the umbrella of this interest group, see http://www.w3.org/2011/webtv/wiki/TV-related_groups.

The TV Control API community group aims to draft a specification for getting channels or program information independently of the TV device, see http://w3c.github.io/tvapi/spec/. The group has provided an exhaustive comparison of existing TV APIs such as Samsung, LG, etc., see http://www.w3.org/community/tvapi/wiki/Main_Page/Requirements_Mapping. The part of the LinkedTV ontology that represents the broadcast service and the program information is currently based on the model proposed by the BBC and promoted by schema.org. This model could later on benefit from implementations of this standard API.

The Second Screen Presentation Working Group aims to standardize an API to enable web content to access external presentation-type displays and use them for presenting web content, see http://w3c.github.io/presentation-api/. The working group gathers 44 participants from 19 different organizations. EURECOM is participating on behalf of the LinkedTV consortium. At its core, the specification enables an exchange of messages between a requesting page and a presentation page shown in the secondary display. What is out of scope, however, are means that include lower level APIs to discover and communicate between devices. One reference implementation of the current specification has been developed by Fraunhofer FOKUS, via the FAMIUM toolkit:

- Documentation: https://gitlab.fokus.fraunhofer.de/famium/famium-webscreens/wikis/home
- Cordova plugin: https://github.com/fraunhoferfokus/cordova-plugin-presentation
- Demo: https://github.com/fraunhoferfokus/cordova-plugin-presentation

The multiscreen toolkit developed by LinkedTV partner Noterik is an obvious other candidate that could be a referenced implementation of this specification.

3.2.2 Web Annotation Working Group

The Web Annotation Working Group (http://www.w3.org/annotation/) is chartered to develop a set of specifications for an interoperable, sharable, distributed Web annotation architecture.

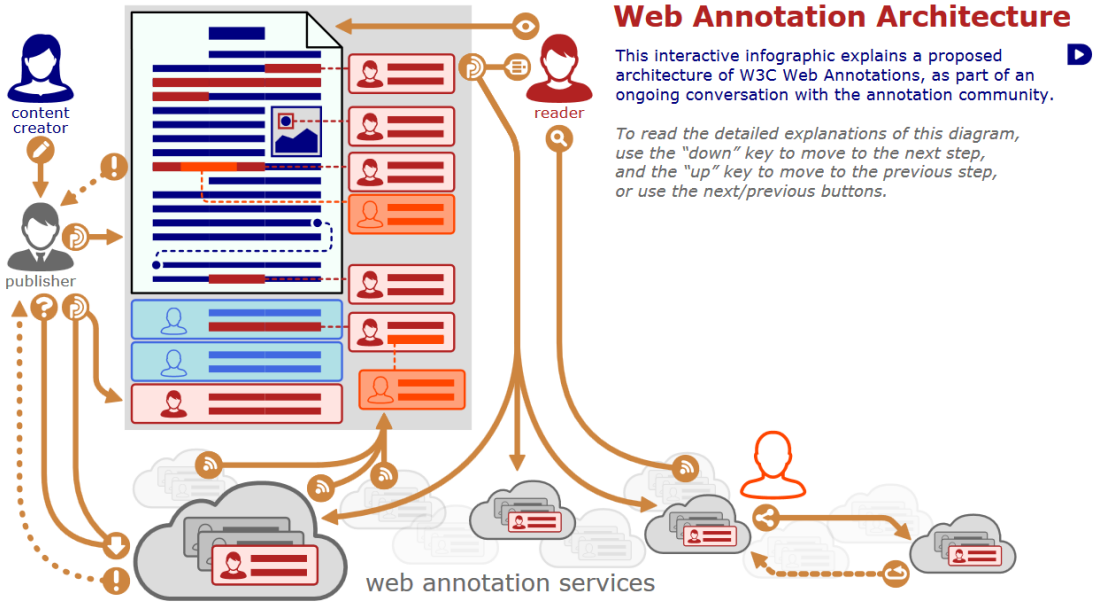

Figure 4: Web Annotation Architecture

See an infographics describing the purpose of the Web Annotation architecture at http://www.w3.org/annotation/diagrams/annotation-architecture.svg

The working group has produced three draft specifications so far:

- Web Annotation Model: http://www.w3.org/TR/annotation-model/
- Range Finder API: http://w3c.github.io/web-annotation/api/rangefinder/
- Web Annotation Protocol: http://w3c.github.io/web-annotation/protocol/wd/

The LinkedTV data model fully re-uses the Web Annotation model. In particular, each description of a media fragment, either coming from a multimedia analysis process or from an entity recognition process over the TV program subtitles is represented using the web annotation ontology described at http://w3.org/ns/oa#. Similarly, the enrichments proposed by the LinkedTV enrichment services are serialized using this ontology while using a different motivation, such as Linking.

LinkedTV has positively influenced the standard specification so that the recommended way to address portions of videos makes use of the W3C Media Fragment URI specification, which has been finalized during the first months of the LinkedTV project.

3.3 hbbTV

HbbTV 2.0 was released as a new specification for hybrid broadband-broadcast TV in February 2015. LinkedTV welcomes this strongly as, just as we reported in our position paper on HbbTV 2.0 in March 2014, we needed in particular for enriched broadcast TV:

- Broadcast stream identifiers to refer to specific (yet repeated) TV programming aligned to EPG identification
- Media Fragment URIs for use with those identifiers
- Annotations of TV programming in the broadcast stream (e.g. Timed Annotation Track) or from the Web synced to the broadcast stream (e.g. URLs by StreamEvent with an offset such as chapter markers)
- TV channels able to contact companion screens and open URLs there / send sync data like 'next chapter'

Unfortunately the first and third points have not been addressed, with program streams still typically identified by stream locators such as CRIDs which are not directly connected to the TV program metadata. Rather, applications must still rely on EPG data to assume the identity of a TV program based on channel and time, but again because EPGs do not follow any standard program identification rules. In HbbTV, this issue is not critical as the broadcaster can identify the program in any way they wish using StreamEvents and thus a LinkedTV-supporting broadcaster would signal to a LinkedTV app in this way the identifier to be used to get the annotations and enrichments from the LinkedTV Platform. Likewise, HbbTV 2.0 chooses to be agnostic to any annotations of TV programming being passed to the client with the client application being responsible to be able to parse any annotations that would be available. We find it unfortunate that there is no stronger approach intended to guide broadcasters in identifying the programs, making accessible metadata for the program and following a commonly understood metadata model for that metadata. We find the BBC's usage of Linked Data URIs for its programming a good example of what could be done. LinkedTV's own metadata model extends the BBC Programme Ontology (which models how a broadcast fits inside the structure of series and episodes and has common metadata like cast or first transmission date) and EBUs TVAnytime (EPG-like data) with LinkedTV specifics such as the segmentation of the program, annotations of each segment and enrichments with links to related information, using the W3C supported Open Annotation Model. We consider this a suitable basis for wider usage in the broadcast industry and opened discussions with the EBU regarding support for our ontology.

However, the second and fourth points are addressed explicitly in the HbbTV 2.0 document. Support for fragment qualifiers on DVB URLs has been added and marked as **mandatory**, with the explicit reference to use of W3C Media Fragment URIs. LinkedTV supported media fragments in the segmentation of TV programming from the beginning and expressively requires the use of this syntax in its metadata model when referring to TV program fragments.

On the last point, discovering and connecting to companion screens has been a key requirement of LinkedTV since adding second screen support to its scenarios in the first year of the project. Even our HbbTV 1.5 demo has had to rely on Web-based signalling (basically connecting both devices to the same URL) and a QR code on the main screen to pass the URL to the companion screen. The HbbTV 2.0 support thus meets a key project requirement,

while the actual implementation will need to be tested. Fundamentally the screen discovery and synchronisation is handled by the DIAL specification, and the specification also covers the issue of expressing and determining the timing relationship between screens. It still remains that the second screen device needs to have a supporting application to respond to the main screen request, i.e. the SmartTV can not for example simply open an arbitrary URL on the second screen (unless the device has chosen to let a Web browser be a supporting application). Regardless, when the screens are connected, StreamEvents in the main screen (HbbTV 2.0) device could provide signals to be sent to the companion screen (like the identifier of the next TV program chapter, so that the companion device can query for the enrichments in time).

LinkedTV partner RBB is already continuing to explore the possibilities to enrich TV content using HbbTV through a collaboration in EuropeanaSpace. In a workshop in February 2015, they were able to use the MultiScreen Toolkit to develop a small HbbTV app to view a tour of the Berlin wall on a TV screen, with a smartphone or tablet serving as a remote control. Viewers can click a link on their phone, acting as a second screen, after which the Berlin wall tour is loaded on the main screen (TV). Other participants were impressed at how we were able to use our toolkit to build a working multiscreen application in a relatively short time. Together with Sound and Vision we were able to add links to related content using their Editor Tool which then become available to viewers on the second screen while the Berlin wall documentary plays on their TV– taking an activity which today requires building dedicated applications and making it quick and simple for editors thanks to the support of the Multiscreen Toolkit to handle the enrichments created in the Editor Tool. The whole experience showed the value of the LinkedTV technology workflow, giving broadcasters eased access to enriching their TV programming with other content and handling its delivery synchronised across screens to their viewers. This demo will be continued at the EuropeanaSpace Hackathon in May 2015 and continues to show how LinkedTV tools can be used by broadcasters to create innovative apps. In particular, the Multiscreen Toolkit which was extended to work with HbbTV 1.5 will hopefully be extended within the boundaries of a future project to support HbbTV 2.0. LinkedTV scientific coordinator Lyndon Nixon presented LinkedTV's position on HbbTV 2.0 to the EBU BroadThinking conference in March 2015 with many EBU member broadcasters present. He also initiated contact to the EBU with a view to continue to participate in their activities around HbbTV 2.0 and align LinkedTV results to it.