



Social listening of City Scale Events using the Streaming Linked Data Framework

MILAN
DESIGN
WEEK 2013

Authors: Marco Balduini, Emanuele Della Valle, and Daniele Dell'Aglio,
Mikalai Tsytsarau, Themis Palpanas, Cristian Confalonieri

Presented by: Ting Xiao 11/18/2013

+ What is City-Scale Events?

- a group of events (usually with a common topic) located in multiple venues around a city.



LA MÁS IMPRESIONANTE EXPLOSIÓN DE SENSACIONES DANCE

Este año Gijón acoge uno de los mayores y más ambiciosos proyectos musicales que se puedan dar en esta ciudad y sin ningún referente hasta la fecha en el norte de España.

Basado en la música, cuidando especialmente el sonido y resaltando sobretodo la imagen, VOLARE será la mayor fiesta musical que tenga lugar este año en la capital de la costa verde.

Nuestro claim "The White Festival" se convierte en una de las partes más importantes de un evento del que todo el mundo habla y del que tú tienes la oportunidad de disfrutar y participar.

Anna Grace y Jennifer René, diosa y princesa de la música trance, el rey del verano David Tavaré, Guru Josh con la canción del año, la intérprete del reciente nº 1 en los países bajos Chelci-D o DJ Sammy, mejor dj en directo del planeta, son algunos de los ingredientes para una noche especial dedicada a la música dance que convertirá el pabellón central de FeriAsturias en una enorme pista de baile.

Las entradas se pueden conseguir a través de Ticketmaster y su red de establecimientos autorizados (FNAC y Carrefour) que ofrecen la posibilidad de comprar los tickets a través de internet, por teléfono o de forma presencial en dichos centros.

Toda la información del evento en la web www.volaregijon.com.

GIJÓN. SÁBADO 12 DE SEPTIEMBRE. PABELLÓN CENTRAL RECINTO FERIAL.

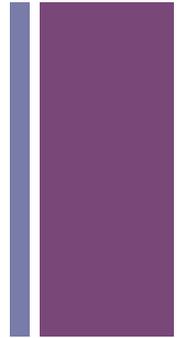
Play Time: 23:00 h.
Apertura de puertas: 21:00 h.
Finalización aprox.: 6:00 h.

Imprescindible vestir de blanco

SE PROMIETE EL ACCESO AL RECINTO A MEMBROS DE SU AMOR

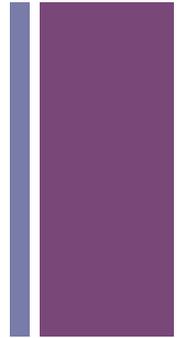
+ Who are interested in?

- City Managers
 - Want to assess the impact on the traffic, pollution, garbage collection
- Organizers
 - Want to monitor the appreciation and popularity of the events
- Sponsors
 - Want to know if their investments are given back in terms of perception and image
- Citizens
 - Want to know the current situation of the events
- Visitors
 - Want to find more popular events



+ Streaming Linked Data (SLD)

- The framework to collect data streams, analyze them and visualize the results in dashboards
- Exploit Several Semantic Technologies
 - RDF to model and integrate the data
 - SPARQL
 - Sentiment Mining Techniques
- Target
 - Collect All The Necessary Information From the Social Web To Predict More Accurate Results Of The Events
- Applications
 - London Olympic Games 2012
 - Milano Design Week 2013

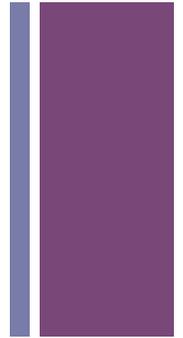


+ User Cases Analysis

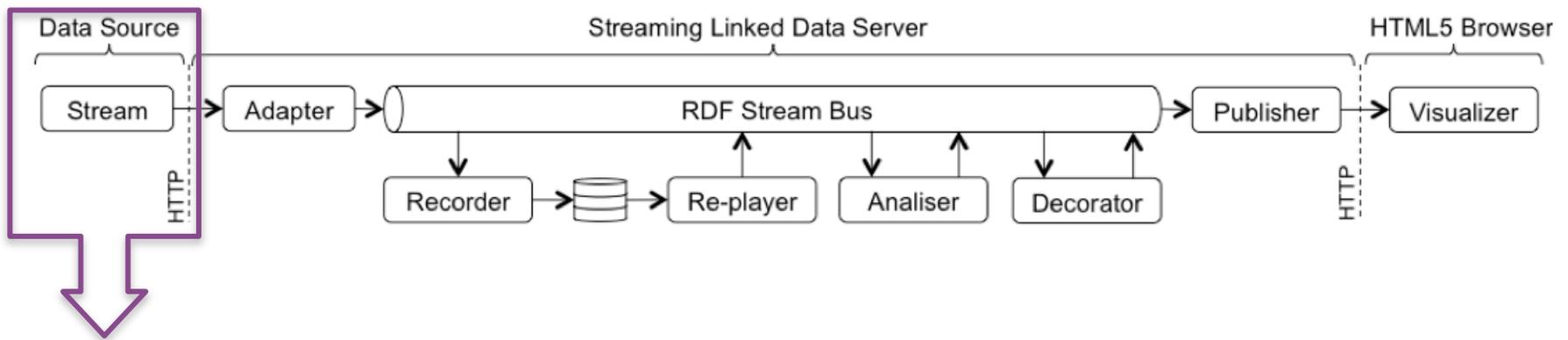
London Olympic Games(2012)	Milano Design Week (2013)
Is it possible to detect the Olympic Games-related events analyzing the Twitter streams?	Is MDW visible in the social streams posted by people in Milano area? If yes in real-time, (a) What are the districts from which MDW visitors post the most? (b) The most frequently used hash-tags? (c) How do people feel before, during and after the event they join?
Is it possible to track the movement of the crowds through geo-tagged tweets?	Is the launch of ASUS products during MDW visible in the social streams posted by people around the world? If yes, not necessarily in real-time, (a) What are the products that attract more attention? (b) What is the global sentiment before, during and after the launch?

+ Technical Requirements

- Accessing the social stream
- Recoding and replaying portions of the social stream
- Decorating the social stream with sentiment information
- Continuously analyzing the social stream
- Internally streaming partial results of the analysis
- Publishing and visualizing continuous analysis results

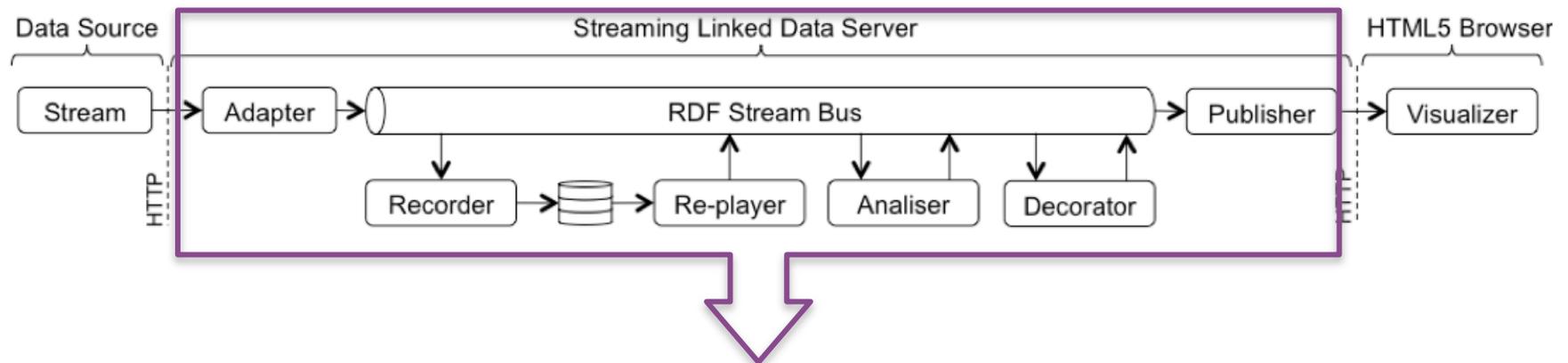
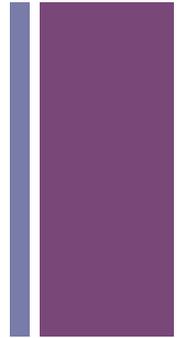


+ Architecture of SLD Framework



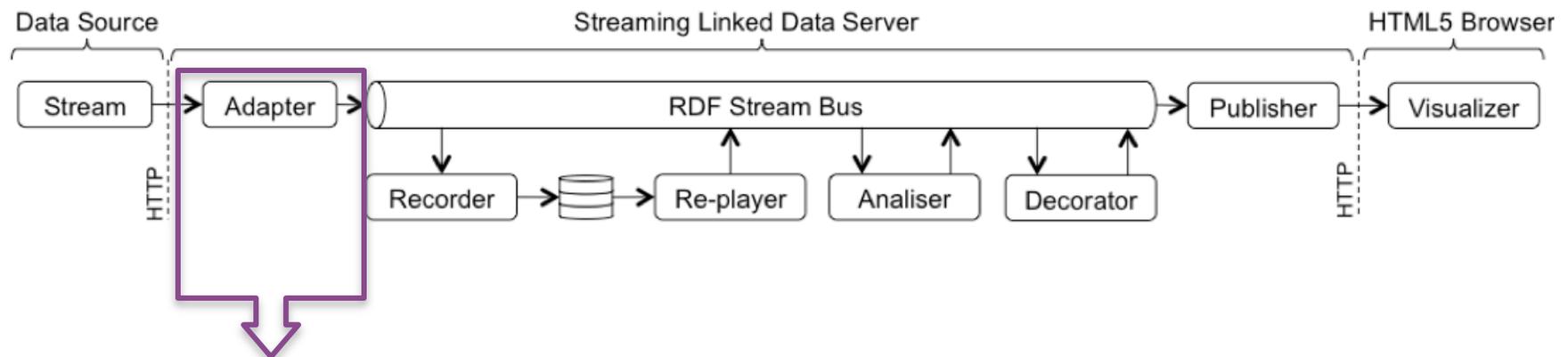
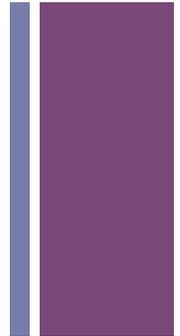
- Streaming Data Source
 - Only used the Twitter Stream Data

+ Architecture of SLD Framework



- The Central Part Of the SLD
 - Accessing data stream sources
 - Internally streaming data
 - Register and replay the portion of data stream
 - Decorate and analyze time-boxed portion of the stream
 - Publish the result

+ Architecture of SLD Framework

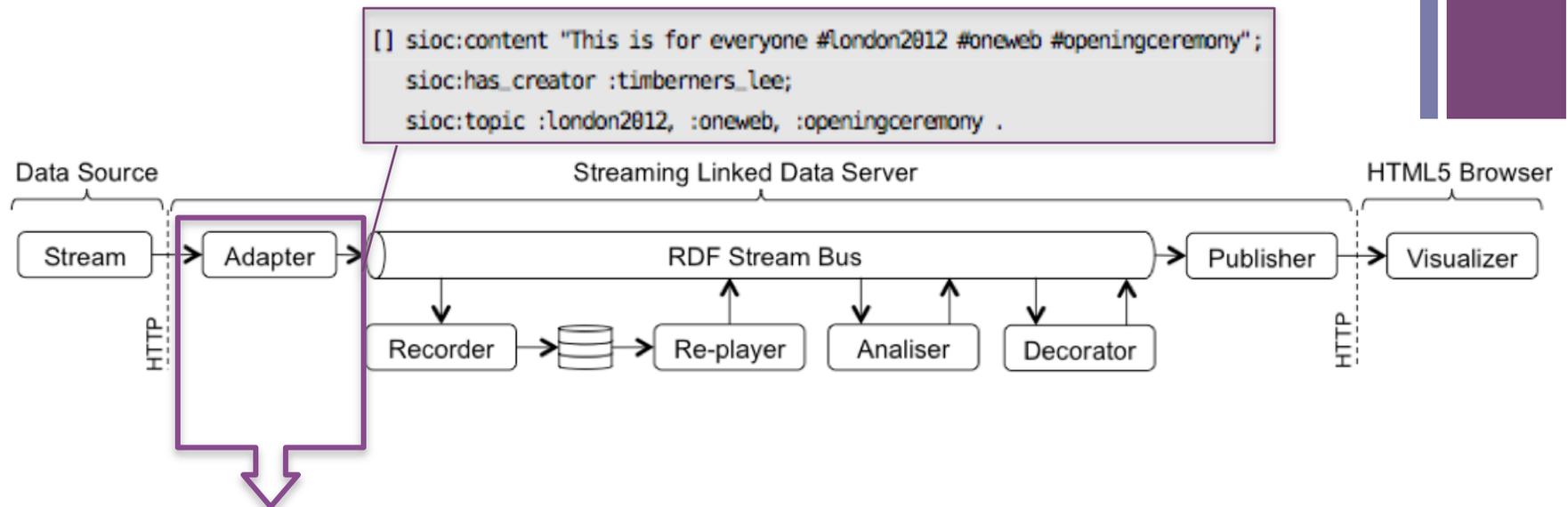
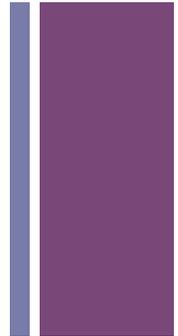


- Access data stream resources
- Do filtering operation to the data source
- Translate the stream data into a set of timestamped RDF triples

Ps, their framework includes several sensor networks adapters, such as Instagram, Foursquare



+ Architecture of SLD Framework

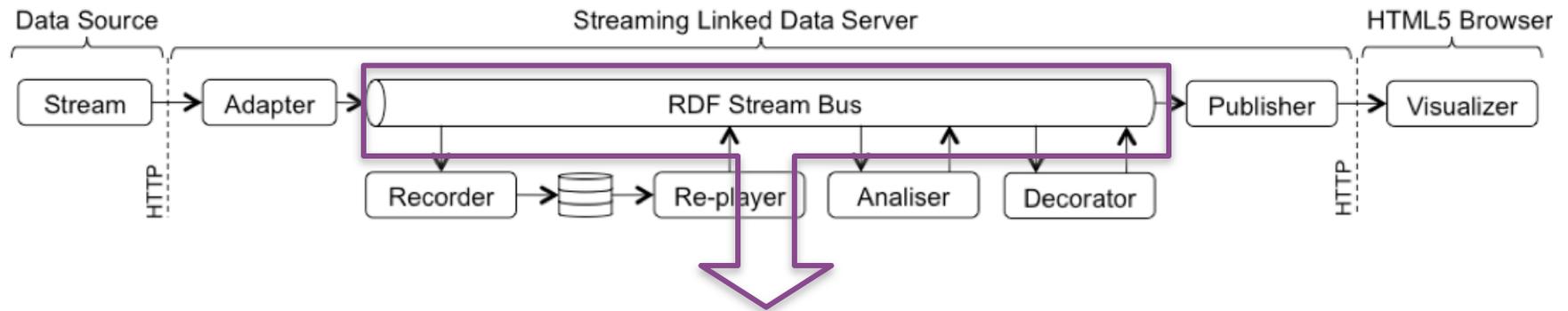
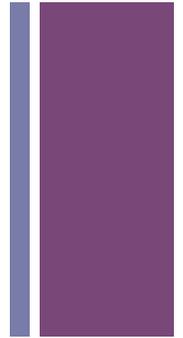


- Access data stream resources
- Do filtering operation to the data source
- Translate the stream data into a set of timestamped RDF triples

Ps, their framework includes several sensor networks adapters, such as Instagram, Foursquare

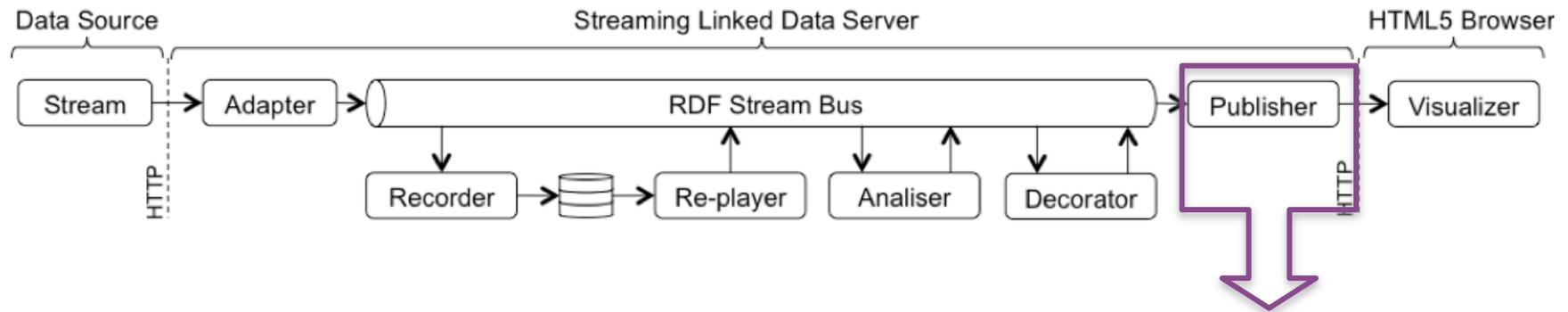
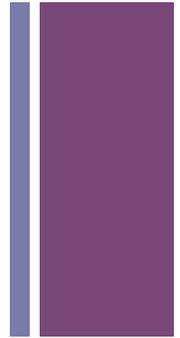


+ Architecture of SLD Framework



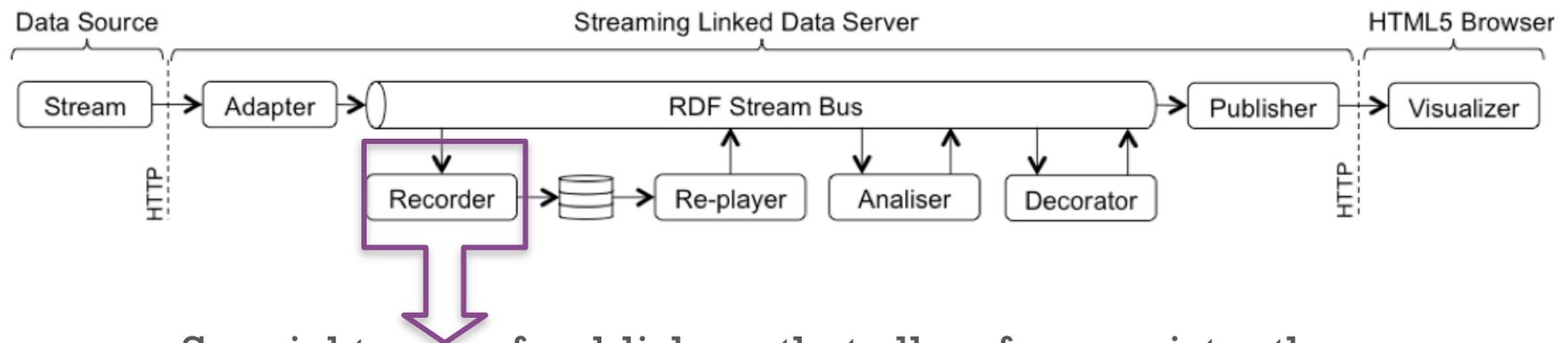
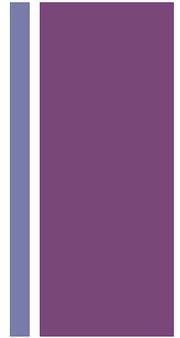
- Support the publish/subscribe communication among the internal components of streaming linked data.

+ Architecture of SLD Framework



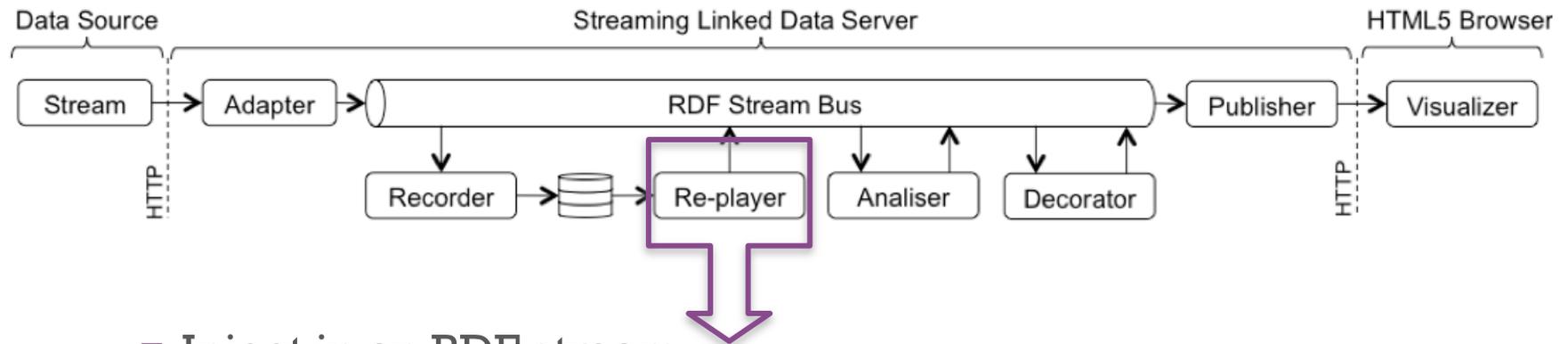
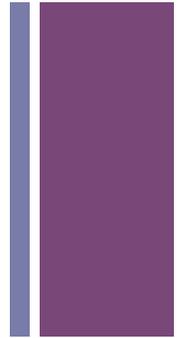
- Make available on Web the content of chosen RDF stream(R.6)
 - Two SLD formats:
 - Instantaneous Graph(iGraphs) : a set triples with same timestamp
 - Stream Graph(sGraphs): a set triples point to one or more timestamped iGraphs

+ Architecture of SLD Framework



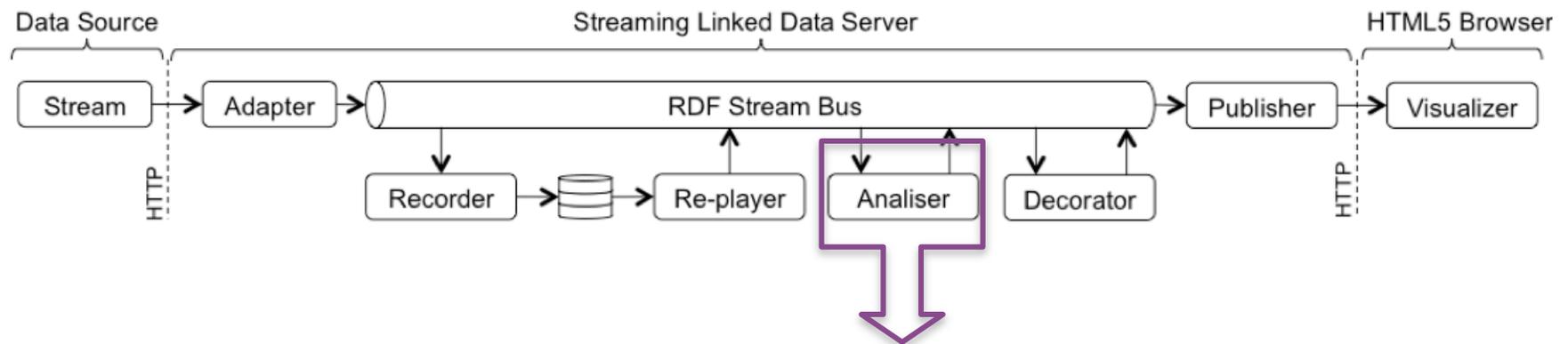
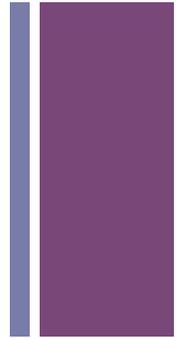
- Special types of publishers that allow for persistently storing a part of an RDF stream
 - Data format: iGraphs + rGraphs
 - rGraphs: similar with sGraphs but they include pointers to all the iGraph recorded and such pointers do not have a time interval of validity.

+ Architecture of SLD Framework



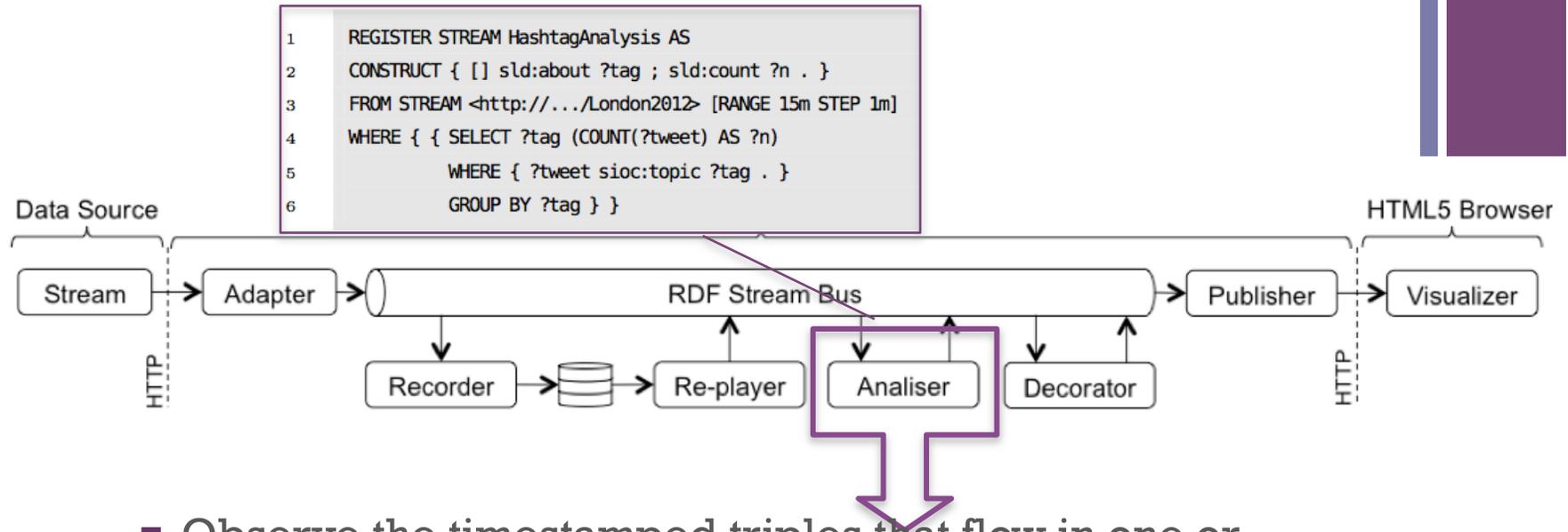
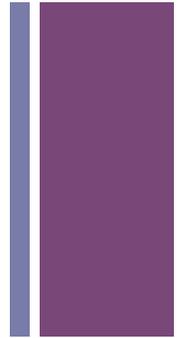
- Inject in an RDF stream
 - Data format: iGraphs

+ Architecture of SLD Framework



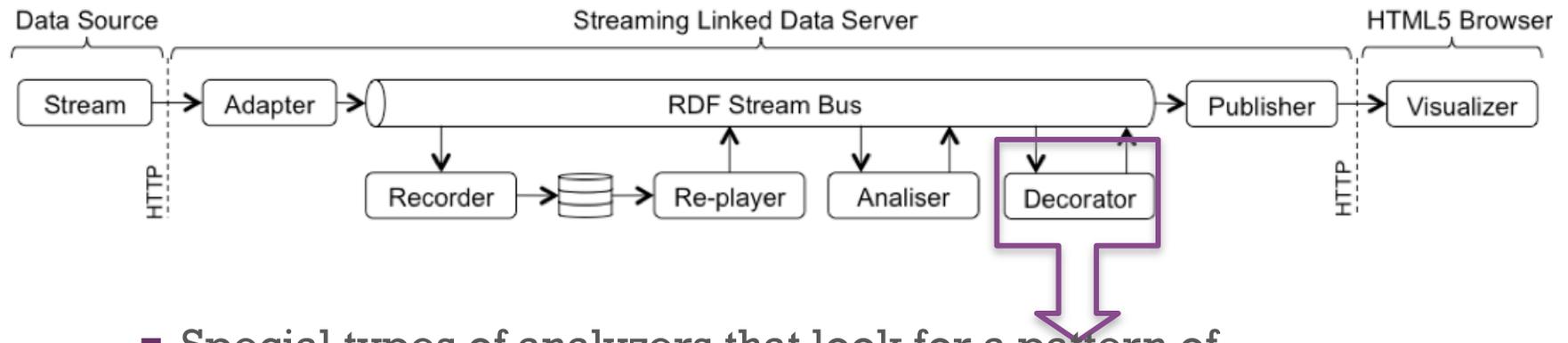
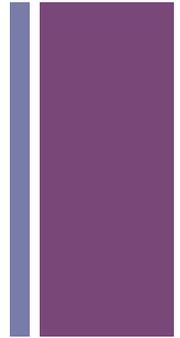
- Observe the timestamped triples that flow in one or more RDF stream
- Perform analysis on them
- Generate a continuous stream of answers
- SPARQL can be plugged in here and used for analyzing

+ Architecture of SLD Framework



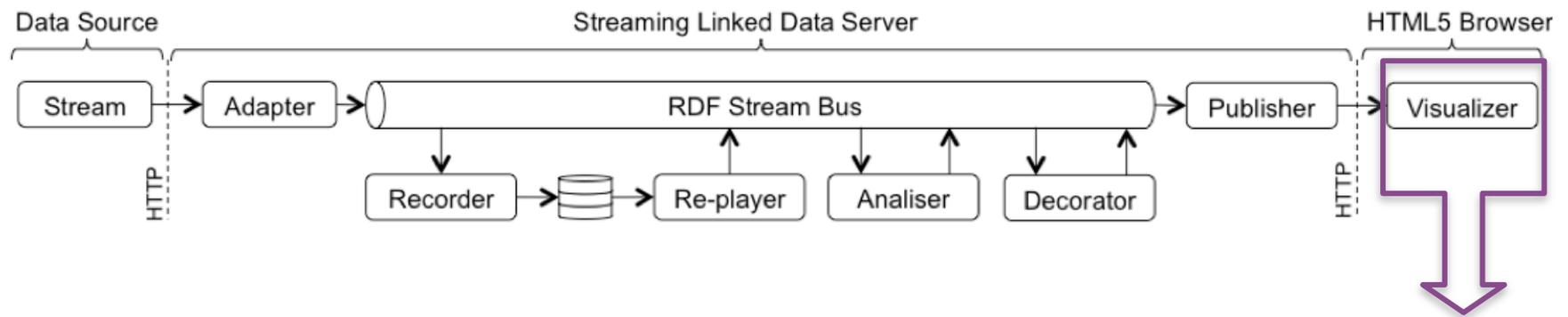
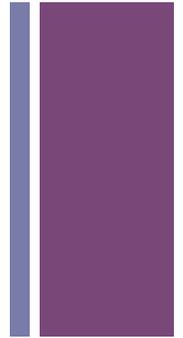
- Observe the timestamped triples that flow in one or more RDF stream
- Perform analysis on them
- Generate a continuous stream of answers
- SPARQL can be plugged in here and used for analyzing

+ Architecture of SLD Framework



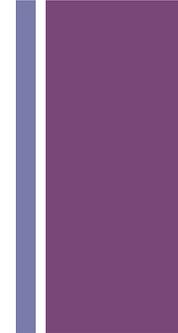
- Special types of analyzers that look for a pattern of triples in RDF stream. When the pattern matches, it run a computation of the matching and add new triples to the stream.
- Include a sentiment mining component, using a dictionary-based sentiment classifier(University of Trento)

+ Architecture of SLD Framework



- A library of visual widgets using HTML5 visualize what is published periodically.

+ Application(1) London Olympic Games 2012

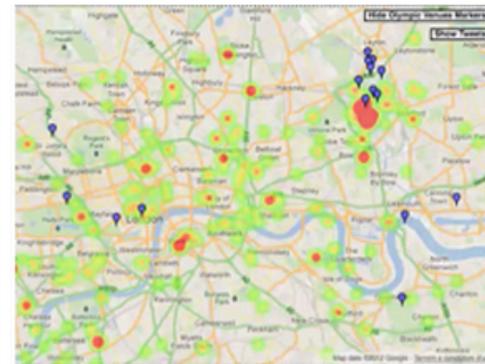


HOME PUBLICATIONS DOWNLOAD DEMOS ORDRING 2013 SR4LD2013 PHD COURSE 2013 BENCHMARKS PAST EVENTS

StreamReasoning

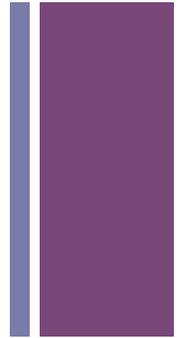
Reasoning Upon Rapidly Changing Information

London 2012 Open Ceremony: Tracking movements and attention of crowds in real time analysing social streams



<http://streamreasoning.org/demos/london2012>

+ Application(1) London Olympic Games 2012



- **Detecting Events:** detect the events given the position of a set of venues and socially listen their surroundings
 - 3 million tweets used
 - July 25th to August 13th (2012)
 - Three venues: big, medium and small
 - Ground truth: calendar of Olympic Games
- **Visualizing Crowd Movements:**
 - The method looks for a sequence of bursts detected first at public transport stations, then in the walkable areas outside the venues and finally in one of the venues.

+ Application(1) London Olympic Games 2012

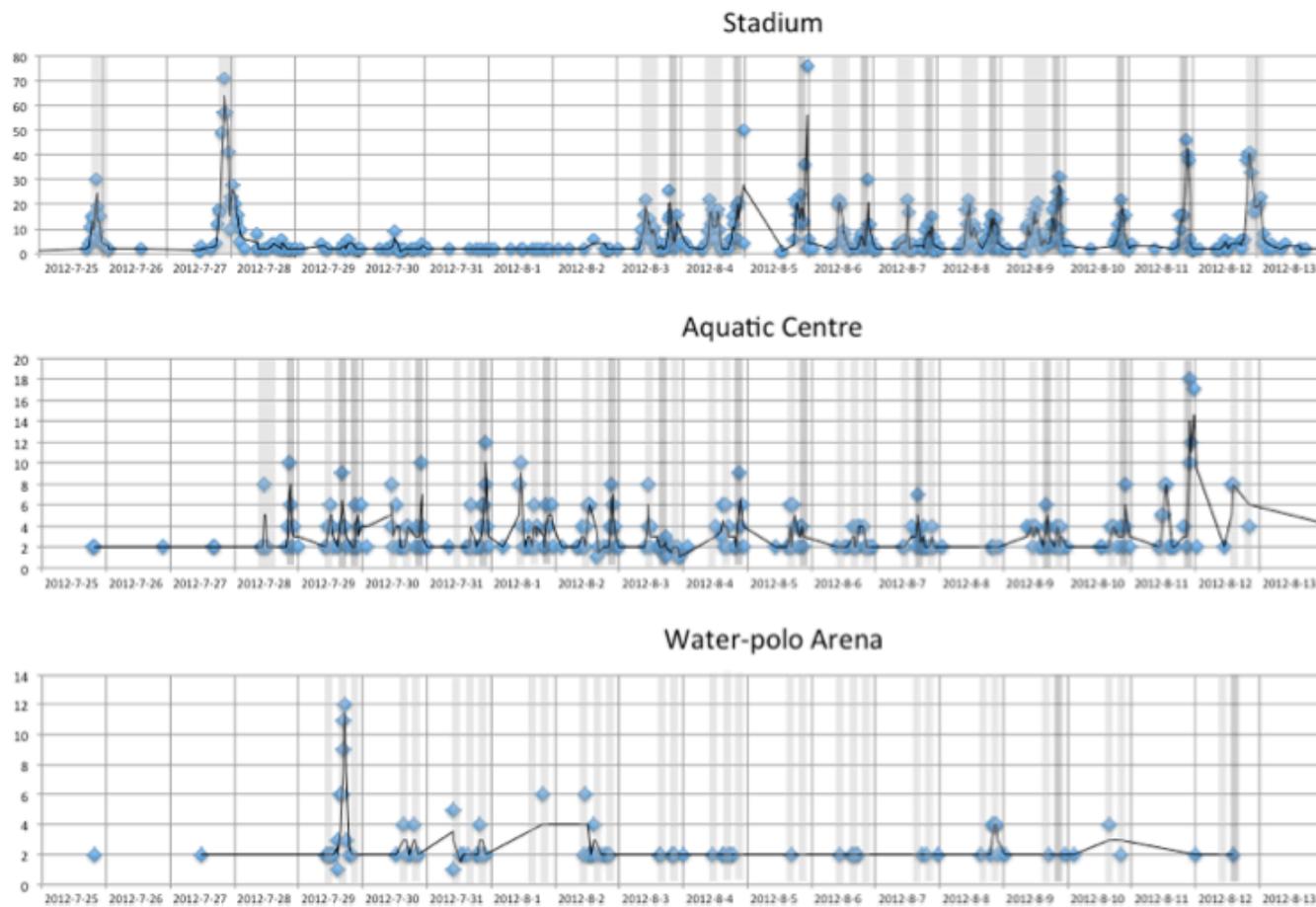
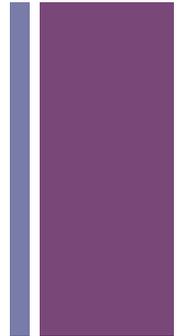
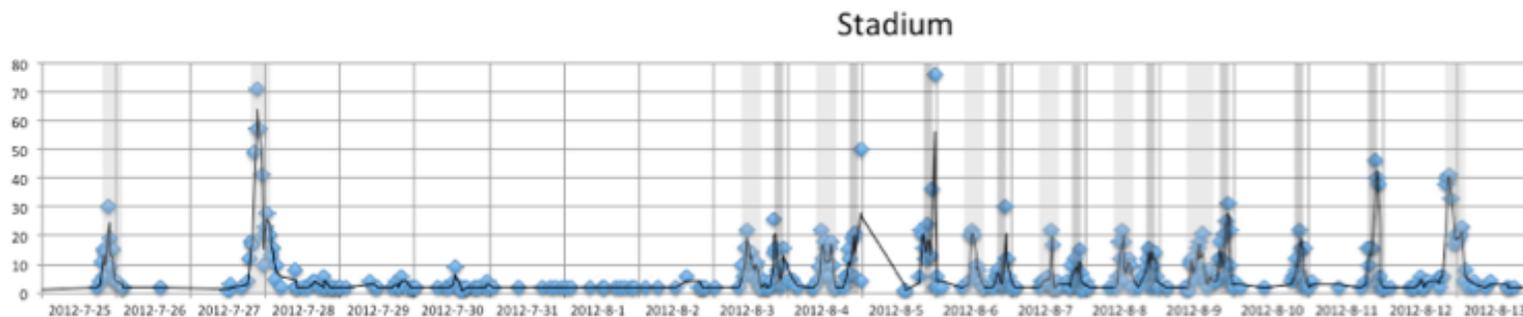


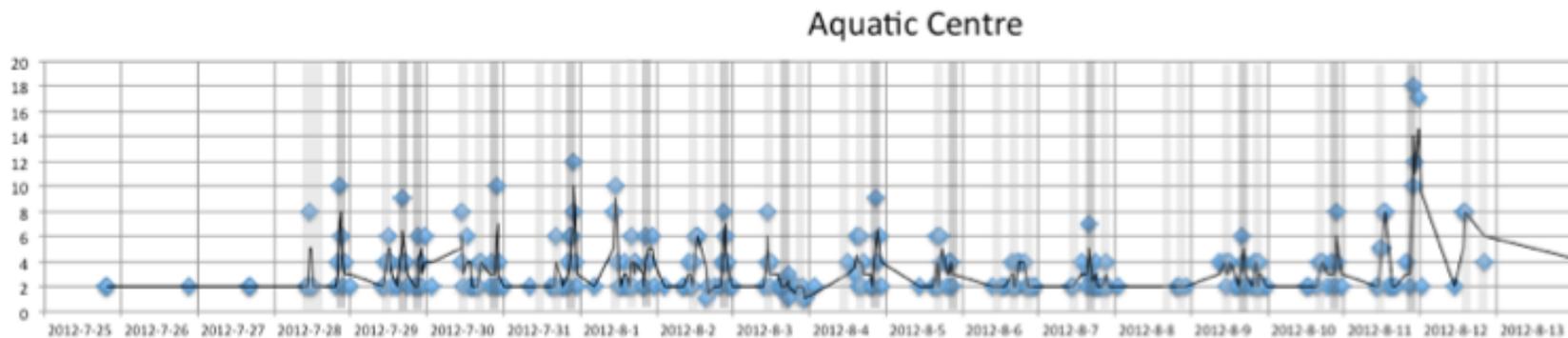
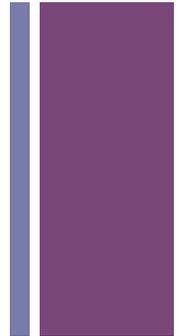
Fig. 2: The results of the event detection experiment.

+ Application(1) London Olympic Games 2012



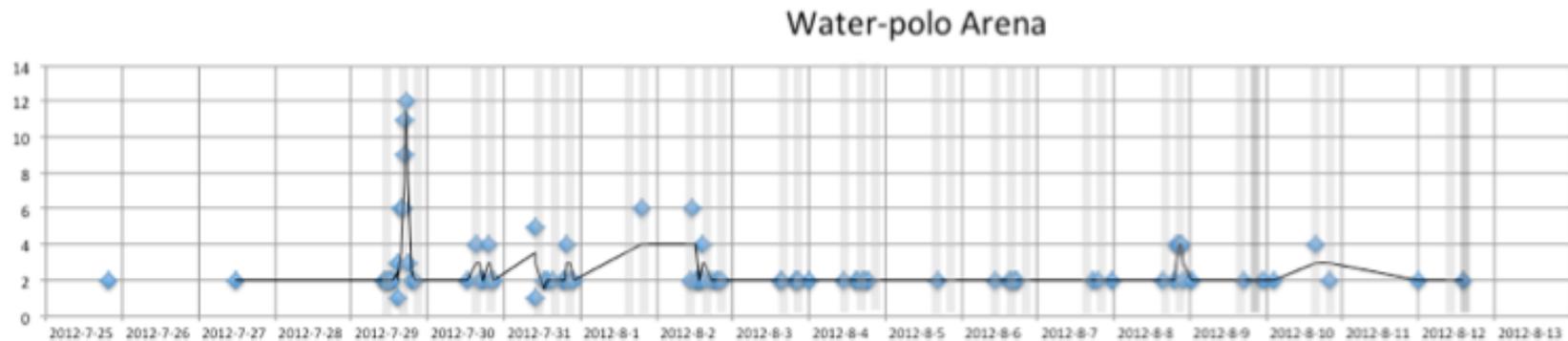
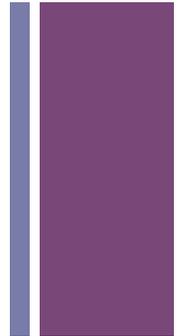
- In the stadium, SLD was able to detect all events in the ground truth:
 - the rehearsal for the opening ceremony on July 25th; the opening ceremony on July 27th;
 - the pair of events scheduled on August 3rd, 4th, and 6th to 9th;
 - the single event on August 5th, 10th, and 11th;
 - The closing ceremony on August 12th.
- The magnitude of the burst is related to the importance of the event
 - On August 4th took place the women's 100 metres final, and on August 5th the men's 100 metres final.

+ Application(1) London Olympic Games 2012



- In the aquatic arena, which attracts less attention in terms of tweets, our method performed with a high precision(i.e., only three unscheduled events were detected before the opening ceremony), but with a recall of 76% (32 events out of the 42 planned).
- In this case the magnitude of the burst speaks for the importance of the event: most of the finals have high peaks.

+ Application(1) London Olympic Games 2012



- In the water polo arena, which is a small venue hosting a single sport, our method was still precise, but the recall was very low (32%, i.e., 11 events out of the 34 planned).
- The only event that generated a large burst was on July 29th.

+ Application(1) London Olympic Games 2012

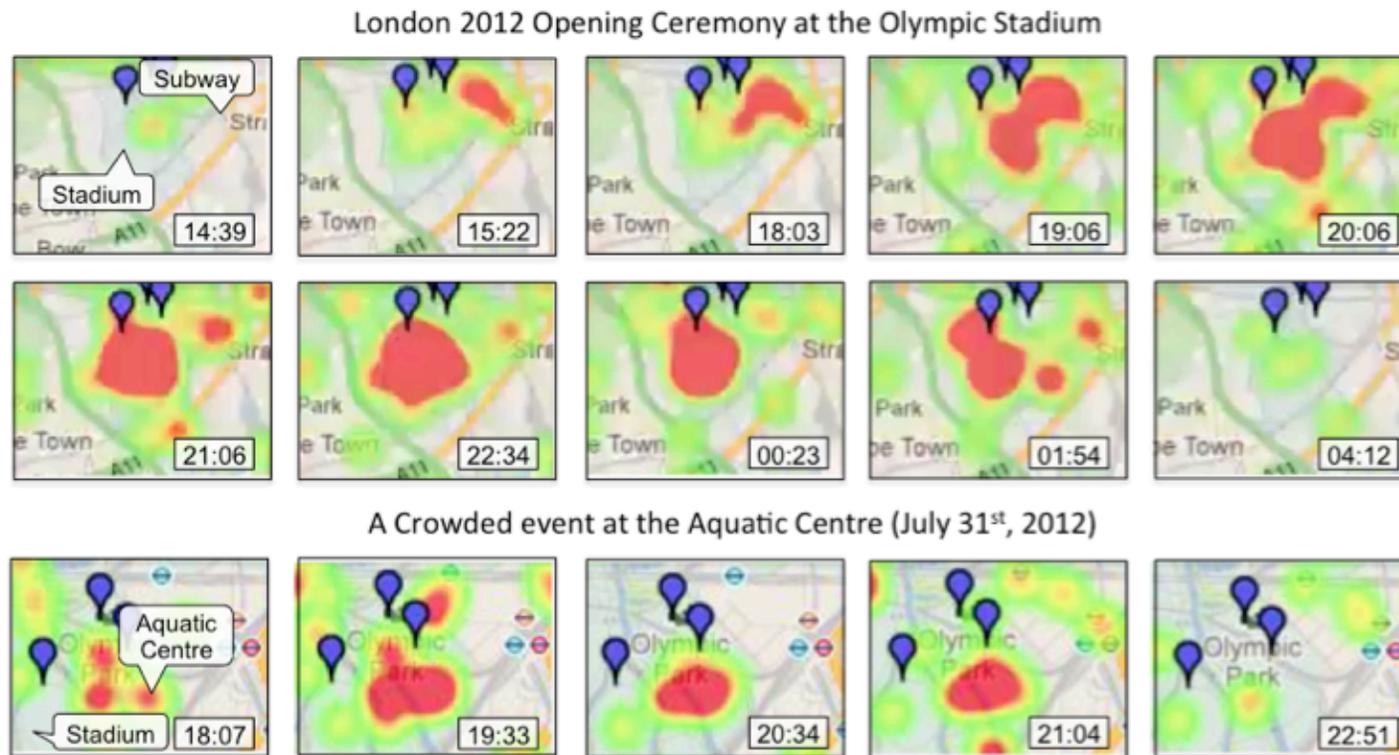
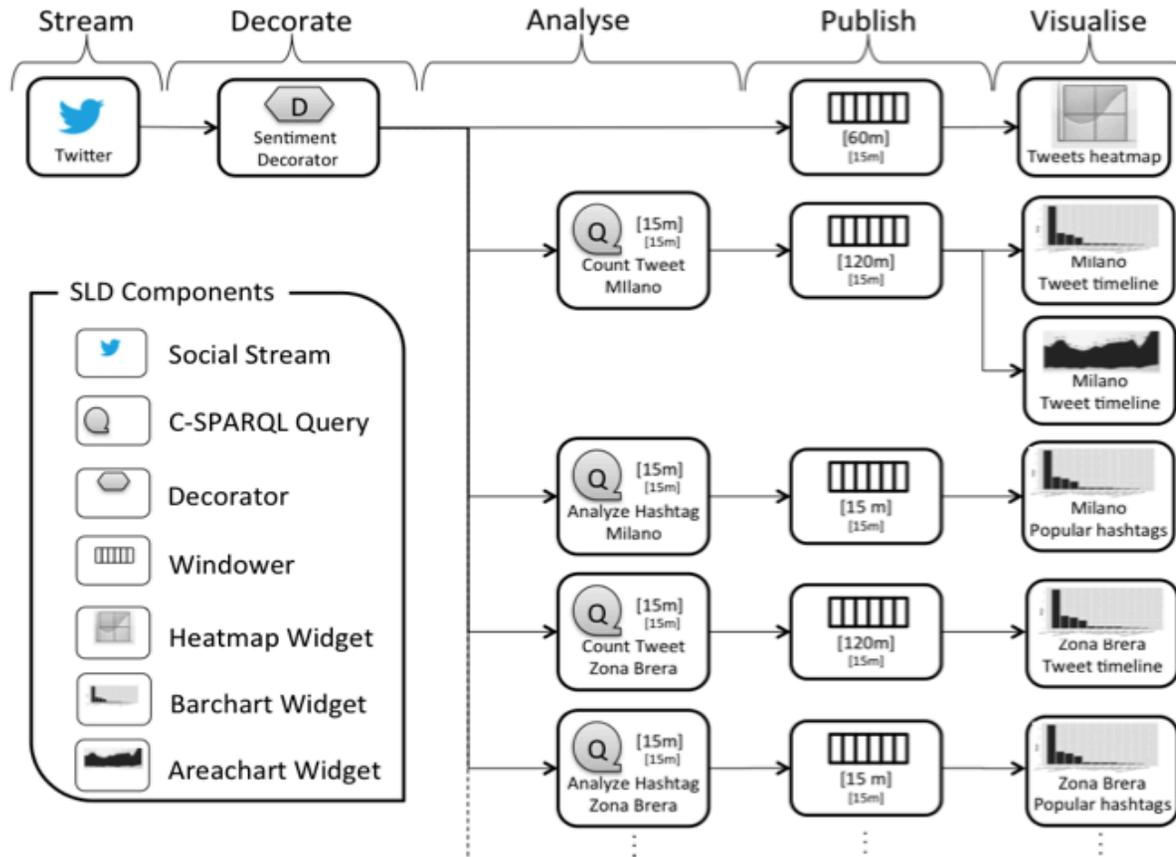


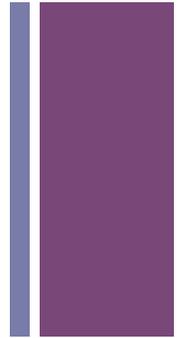
Fig. 3: The sequence of heatmaps visualises the flows of crowd from the public transports to the Olympic venues in two different scenarios.

+ Application(2)

Milano Design Week 2013



Twindex Fuorisalone Layout



+ Application(2) Milano Design Week 2013



HOME PUBLICATIONS DOWNLOAD DEMOS ORDERING 2013 SR4LD2013 PHD COURSE 2013 BENCHMARKS PAST EVENTS

StreamReasoning

Reasoning Upon Rapidly Changing Information

Social listening of Milano Design Week 2013 using the Streaming Linked Data Framework

The Milano Design Week is an important event for the Italian city: every year it attracts more than 500.000 visitors. During that week Milano hosts **Salone Internazionale del Mobile** – the largest furniture fair in the world – and the **Fuorisalone** – more than a thousand of satellite events that are scheduled in more than 650 venues around Milano. These events span the field of industrial design from furniture to consumer electronics. It is the perfect setting for launching products. For instance, in 2013 ASUS launched **FonePad** and presented the new **VivoBook**.

Event managers (e.g., the owners of fuorisalone.it or ASUS Italia) would like to monitor in real time the visitors' reactions. They would like to be able to pose the following questions to some system:

- Which are the most attractive events?
- What do visitors think about the events they join?
- What is their mood before, during and after the event they join?

A screenshot of the StreamReasoning application interface. It displays a heatmap of the city of Milan with various colored markers representing event locations. Below the heatmap, there are social media feeds, including a Twitter feed and a Facebook feed, showing real-time user interactions and comments related to the event.

<http://www.streamreasoning.org/demos/mdw2013>

+ Application(2) Milano Design Week 2013



- Monitor in real time during the MDW 2013 on the tweets posted from Milano
 - 106,770 tweets
 - April 8th and April 17th, 2013 (Still Running)
- HTML5 dashboard was deployed and it was accessible to organizers and visitors of the event
 - <http://www.streamreasoning.org/live/slm/>
- The post-event analysis
 - Results collection of 107,044,487 tweets(MDW, ASUS and its products)
 - April 8th and April 30th, 2013



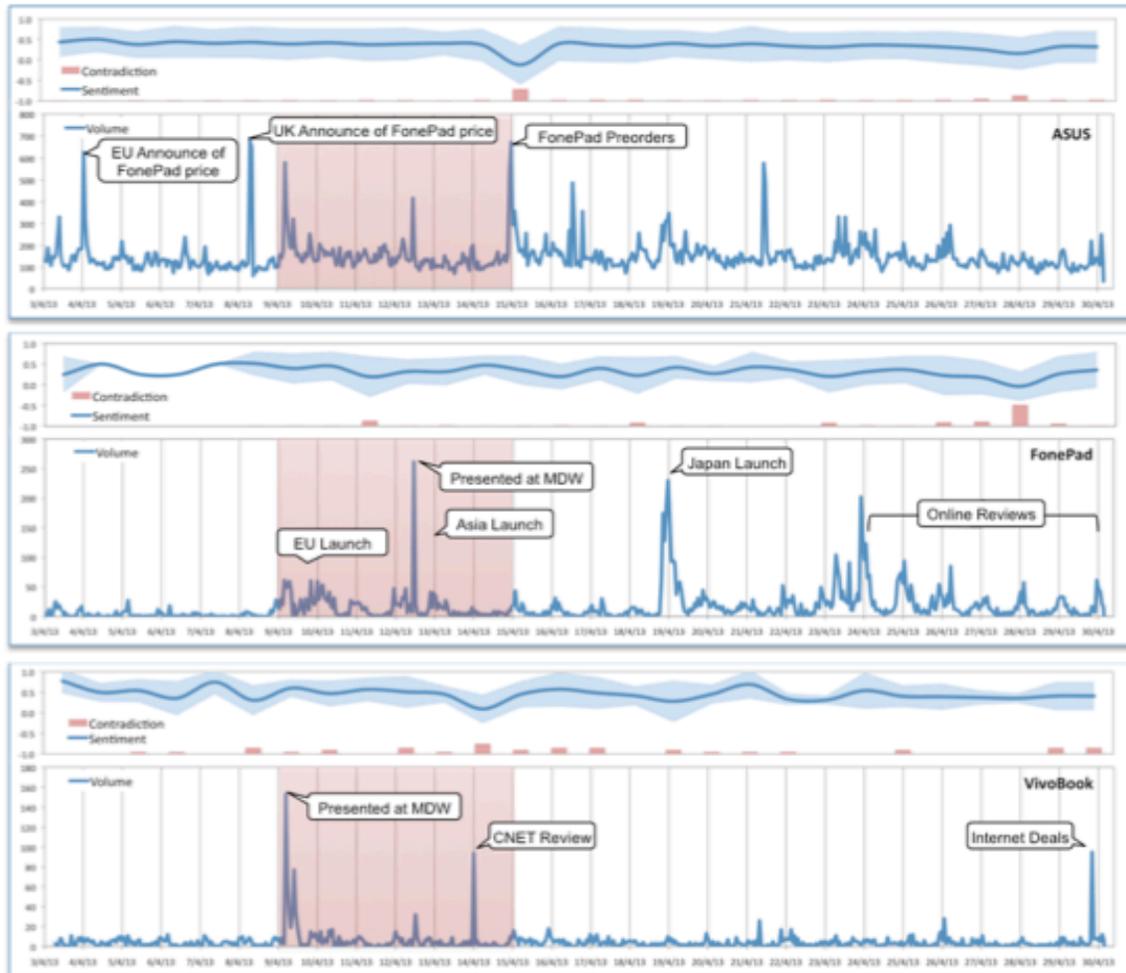
+ Application(2) Milano Design Week 2013



April 9 th , 2013 at 18.00		April 15 th , 2013 at 18.00	
fuorisalone	30	inter	20
designweek	28	diretta	11
nabasalone	20	cagliari	6
milano	9	milan	4
design	6	seriea	3

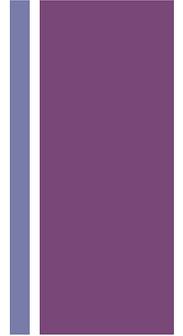
- A comparison between the top-5 hashtags used in geo-tagged tweets in Milano during a late afternoon of MDW 2013 and one after MDW

+ Application(2) Milano Design Week 2013



- A comparison Results of the sentiment analysis carried out on the tweets about ASUS and two of its products: FonePad and VivoBook

+ Conclusion



- Describe and analyze the concrete problems and user requirements for social listening of city-scale events.
- Provide the Streaming Linked Data (SLD) framework and sentiment mining techniques adapted for streaming.
- Report on the pragmatics of deploying and using of SLD to monitor two city-scale events: the London Olympic Games 2012 , and the Milano Design Week 2013. These use cases prove the feasibility of the framework.

+ Thanks

- Any Questions?

