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## Tendencies and Challenges in MultiMedia

Patrice RONDAO ALFACE  Video Technologies  
Bell Labs

MMEDIA 2010, Athens, 15 June 2010

### Transmission of Immersive and Interactive Media

Beyond HD Video Coding

Video, 3D Video, Holographic, Omnidirectional Video...

Narrative schemes


Multi-event/concurrent stories, Mosaics of ROIs, Automatic/personalized director

Interactive Navigation in Video Content

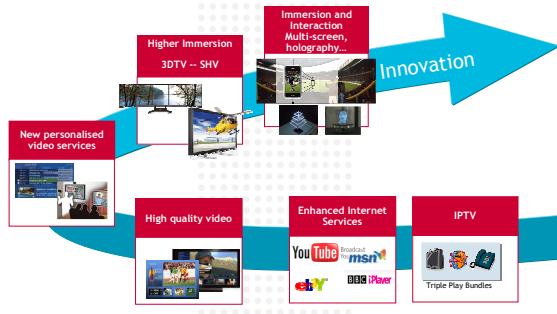
Video Game alike latency and interactions, Gesture recognition

AV Rendering

3D rendered sound, Free Viewpoint Video, 3D video objects rendering

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### Towards the Transmission of Immersive and Interactive Media



**Innovation**

**Higher Immersion**  
3DTV → SHV

**Immersion and Interaction**  
Multi-screen, holography...


**New personalised video services**

**High quality video**

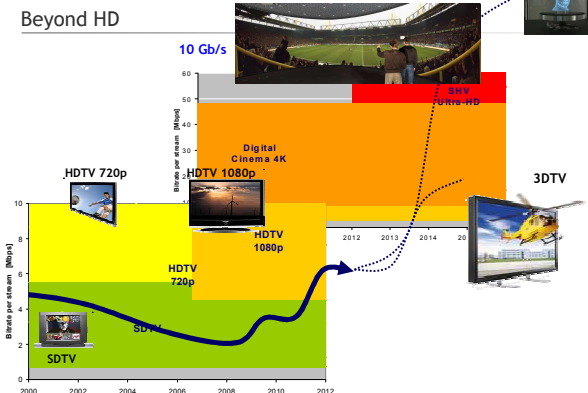
**Enhanced Internet Services**  
YouTube, msn, eMule, iPlayer

**IPTV**  
Triple Play Bundles

**New Consumer desires for video applications will drive network bandwidth requirements**

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### Beyond HD



**Future holography**

**10 Gb/s**


Digital Cinema 4K

HDTV 1080p

HDTV 720p


SDTV

3DTV

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### Driving Example: FascinatE FP7 project (2010-2013)

**Layered Panoramic and Omnidirectional A/V Capturing**



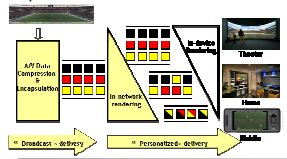
**Video Analysis and Automated Editing**

Region-of-Interest Detection and Tracking



Automated shot framing


**Scalable delivery and in-Network Adaptation of A/V flows**




Personalized delivery

**Immersive and Interactive Applications for End-Users**

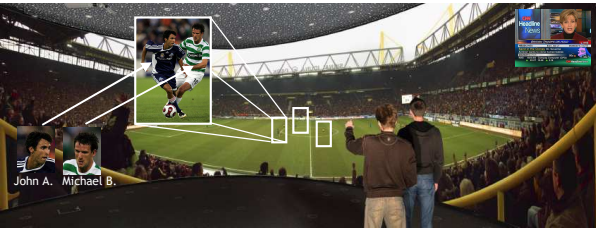
Flexible and Interactive A/V Rendering




Gesture-based user interfaces

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### Narrative Schemes and AV Rendering



John A. Michael B.

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# Multimedia Grand Challenge

# Multimedia – Grand Challenge

- What problems do Nokia, Google, Yahoo, HP, and other companies see in the future of multimedia?

# Multimedia – Grand Challenge

- The Multimedia Grand Challenge is a set of problems and issues from these (and other) industry leaders, geared to engage the Multimedia research community in solving relevant, interesting and challenging questions about the industry's 2 – 5 year horizon for multimedia.

# Multimedia – Grand Challenge

- The Grand Challenge is posed as part of the ACM Multimedia conference.

# Multimedia – Grand Challenge

- Nokia: Photo Location & Orientation
  - Where was this Photo Taken, and How?
  - Derive exact camera poses (location and orientation) of given photos that lack location annotation
- CeWe: Photo Set Theme Identification
  - Automatic Theme Identification of Photo Sets for Digital Print Products

# Multimedia – Grand Challenge

- Google: Indexing and Fast Interactive Searching in Personal Diaries
  - Audio diaries: how to index and search; including location, photos, videos or any other attached media
- Yahoo!: Video Segmentation
  - Robust Automatic Segmentation of Video According to Narrative Themes
  - Indexing and searching within video

# Multimedia – Grand Challenge

- Google: Video Genre Classification
  - Robust, As-Accurate-As-Human Genre Classification for Video
- HP: Visual Communication
  - High Impact Visual Communication
  - Collage of photos with textual description, based, for example, on image analysis, internet data sources, and EXIF tags.



# Multimedia – Grand Challenge

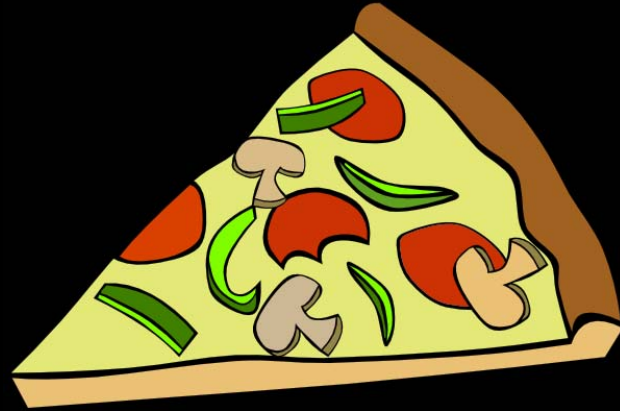
- 3DLife: Sports Activity Analysis in Camera Networks
  - For viewing (e.g. 3D), training, video refereeing
  - Using low-cost video cameras

# Multimedia – Grand Challenge

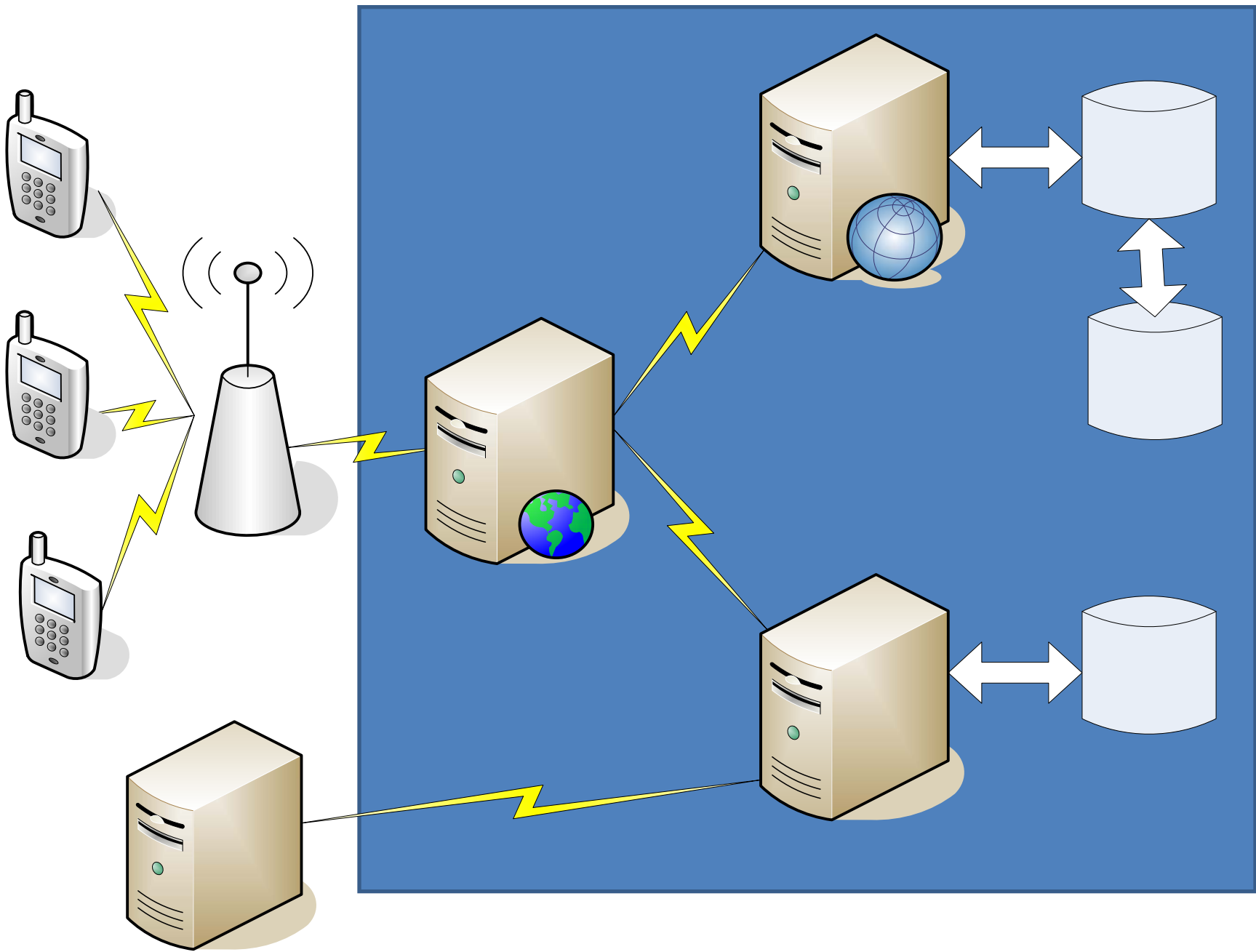
- Radvision: Video Conferencing To Surpass “In-Person” Meeting Experience
- Radvision: Real-time Data Collaboration  
Adaptation for Multi-Device Video Conferencing

# Woodfired Pizza Pizza

Dine In – Take Away – Delivery



Burntpine – Phone 24118  
Open daily at 5 pm.  
Locally owned and operated



# Panel-Discussion: Tendencies and Challenges in MultiMedia

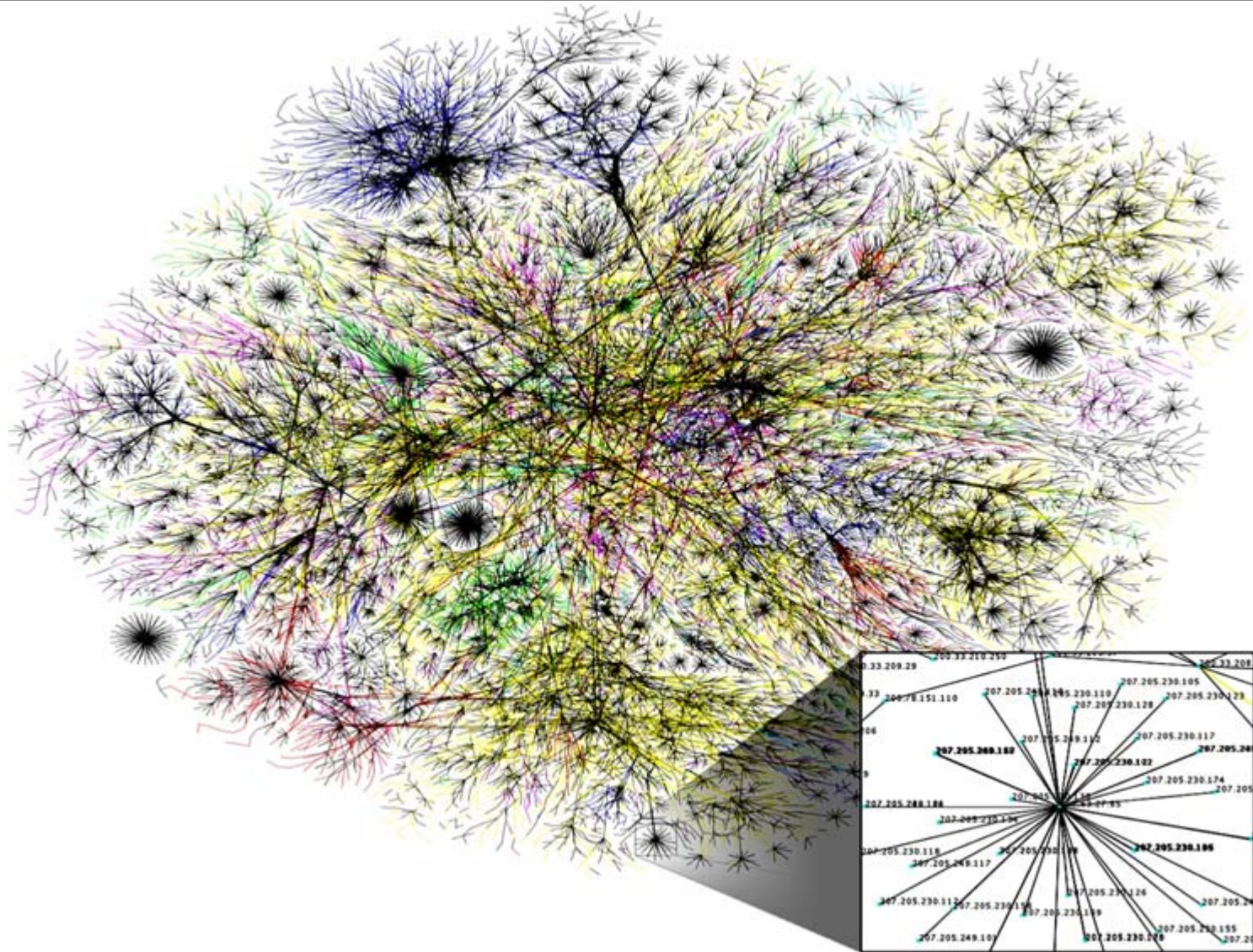
Prof. Dr. Michael Massoth

Hochschule Darmstadt - University of Applied Sciences  
Department of Computer Science  
D-64295 Darmstadt, Germany

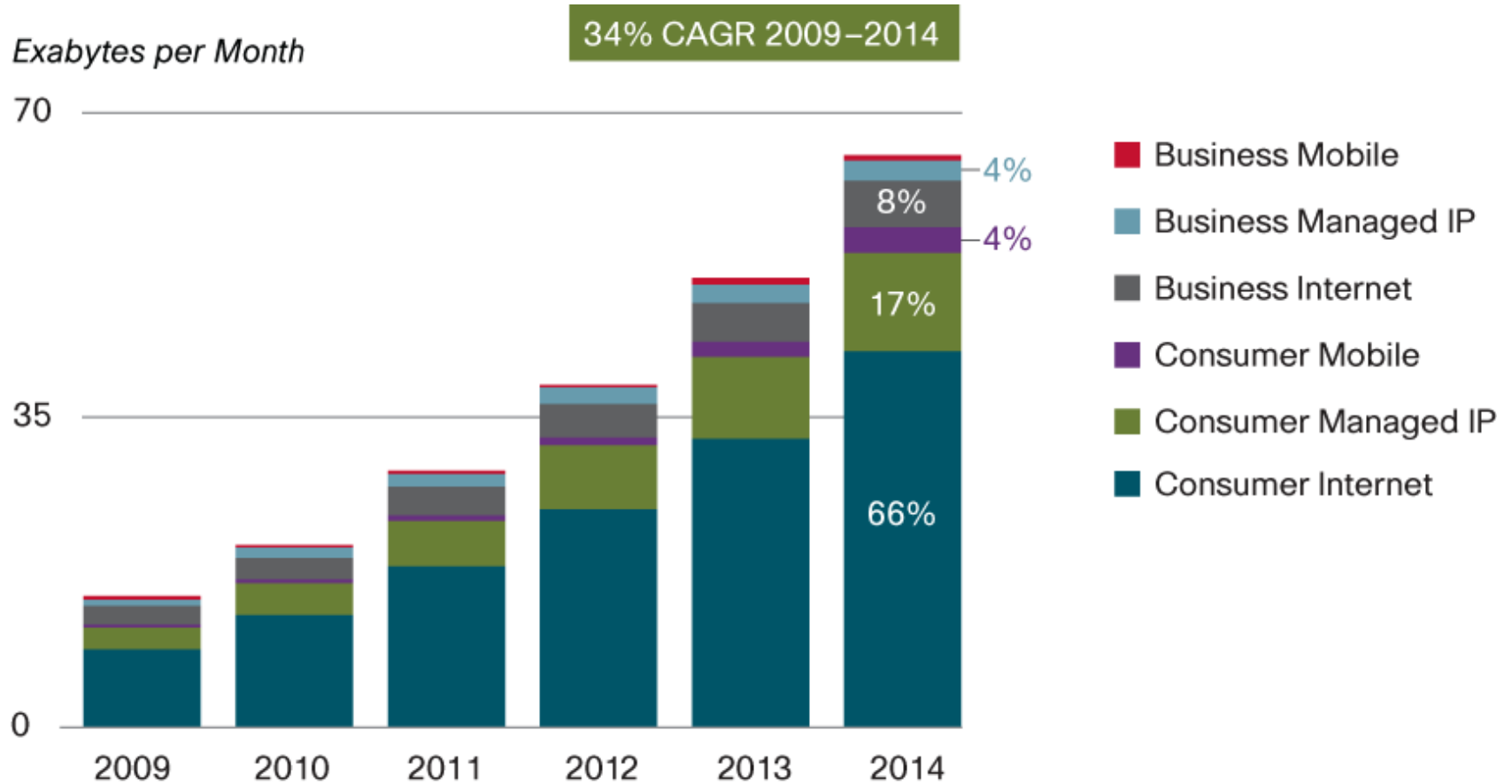


The Second International Conferences on Advances in Multimedia  
June 15th 2010  
Athens / Glyfada, Greece

# The Internet Today



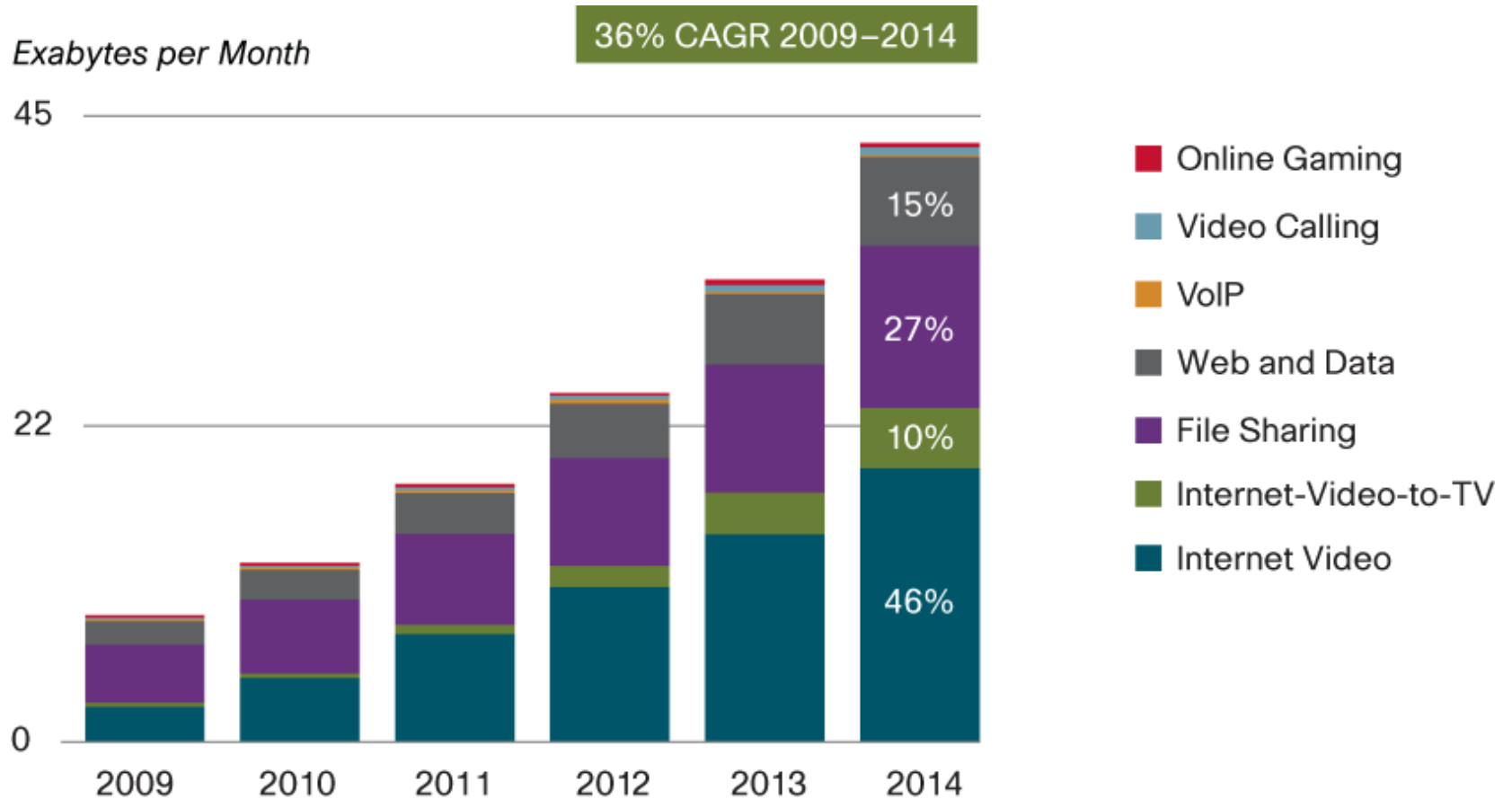
# 64 EB per Month of IP Traffic in 2014



Source: Cisco VNI, 2010

[Cisco, 06/2010]

# Global Consumer Internet Traffic



Source: Cisco VNI, 2010

[Cisco, 06/2010]



## Top 10 Consumer Mobile Applications for 2012:

1. Money Transfer
2. Location-Based Services → will grow to US\$ 526 million
3. Mobile Search
4. Mobile Browsing
5. Mobile Health Monitoring
6. Mobile Payment
7. Near Field Communication Services
8. Mobile Advertising → total spending will grow to US\$ 7.5 billion
9. Mobile Instant Messaging
10. Mobile Music

[Gartner, 11/2009]

# Worldwide Development of Market



- ▶ **IP Multimedia Subsystem equipment** is forecast to grow to US\$ 1,44 billion in 2014  
[Infonetics Research, 03/2010].
- ▶ Number of residential, small- or home office VoIP subscribers grew in 2009 to 132 million  
[Infonetics Research, 04/2010].
- ▶ Total number of mobile VoIP users will be reach 288 million by end of 2013  
[In-Stat, 03/2010].



# Tendencies and Challenges in MultiMedia

**Jean-Claude Moissinac**

**MMEDIA 2010**



## ■ Graduate Education

- Master of Science / PhD / Conversion Master's / pre-doctoral Master / Life-long learning
- 1390 students

## ■ Research

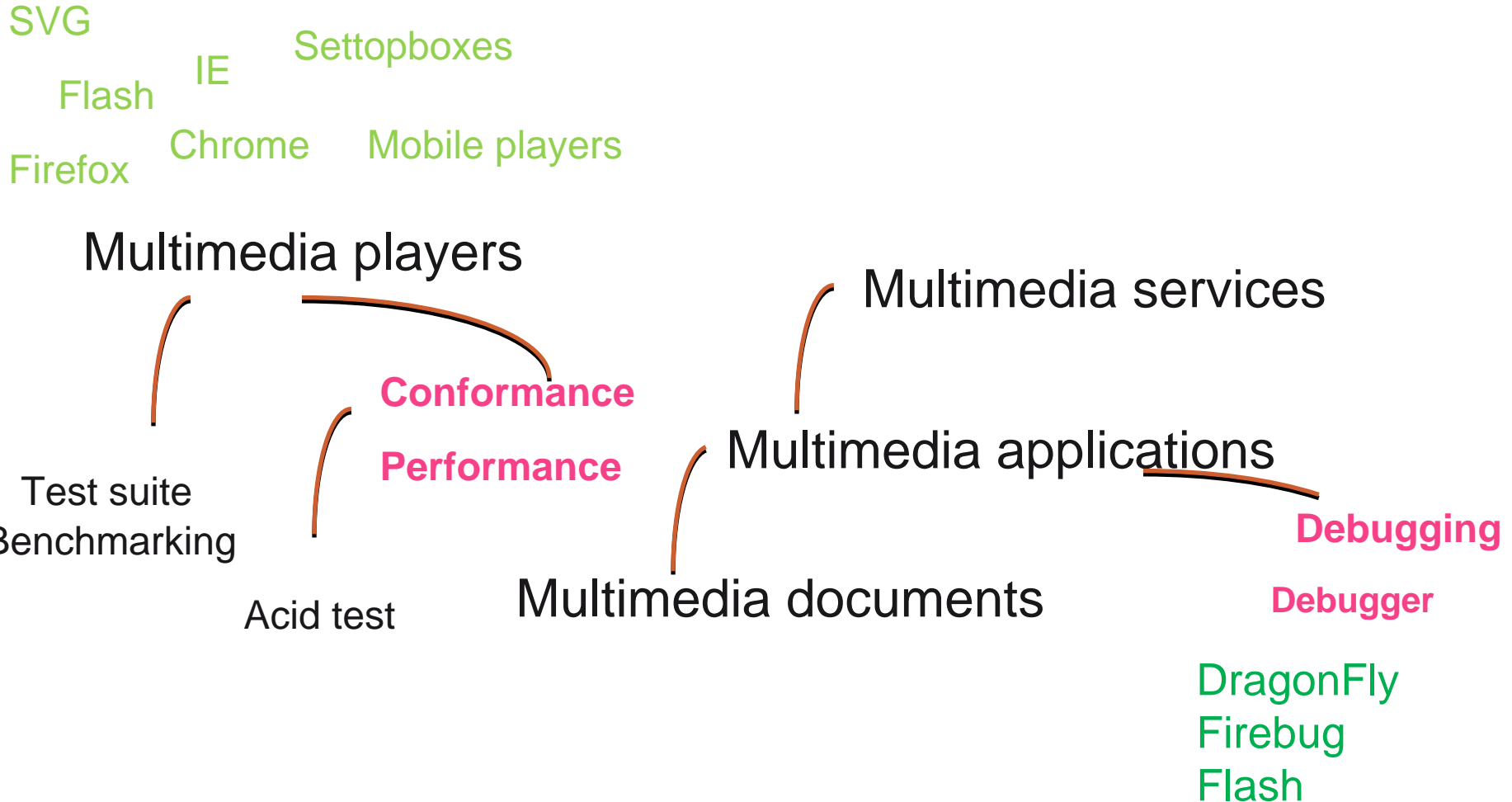
- Scientific & industrial research
- 188 full-time professors, 20 associate researchers (CNRS, ...)
- 700 publications per year

## ■ Relationship with the industry

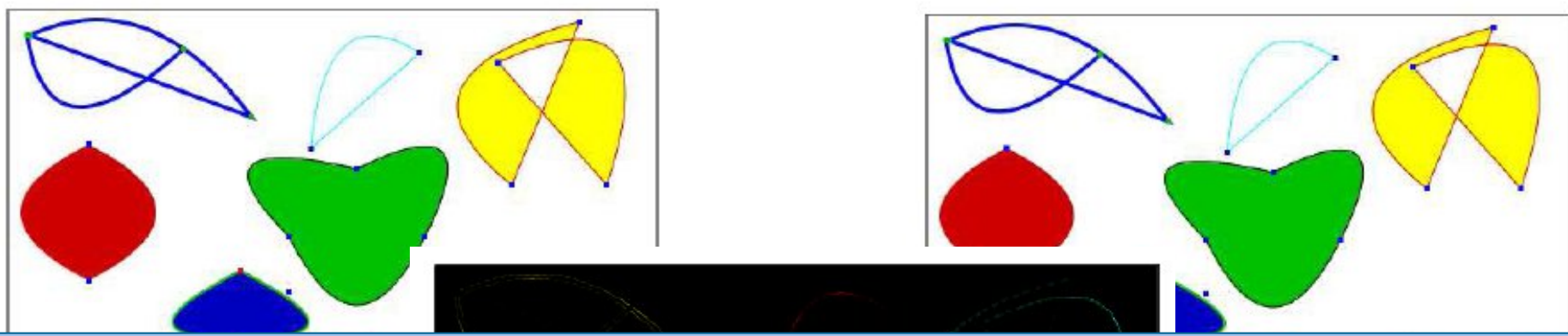
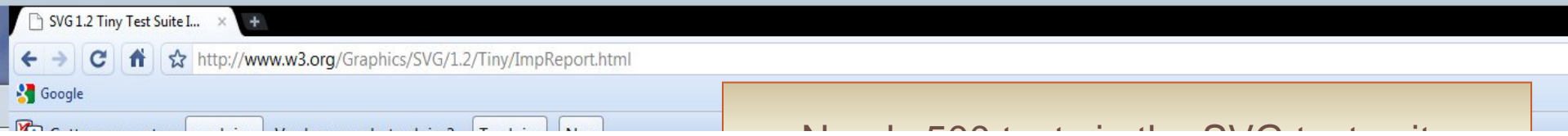
- Entrepreneurship / Expertise / Standardisation
- 110 sustainable companies started since 1999



# To debug and test multimedia objects

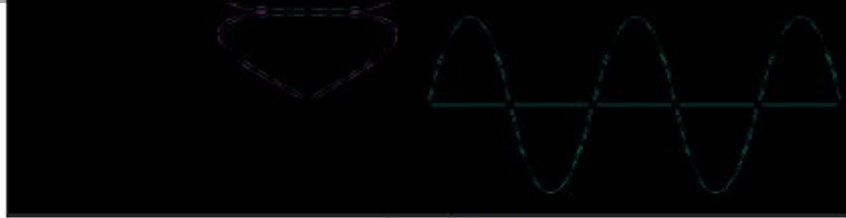


# Example: SVG implementation



A Method for Writing Testable Conformance Requirements  
 W3C Working Group Note 28 January 2010

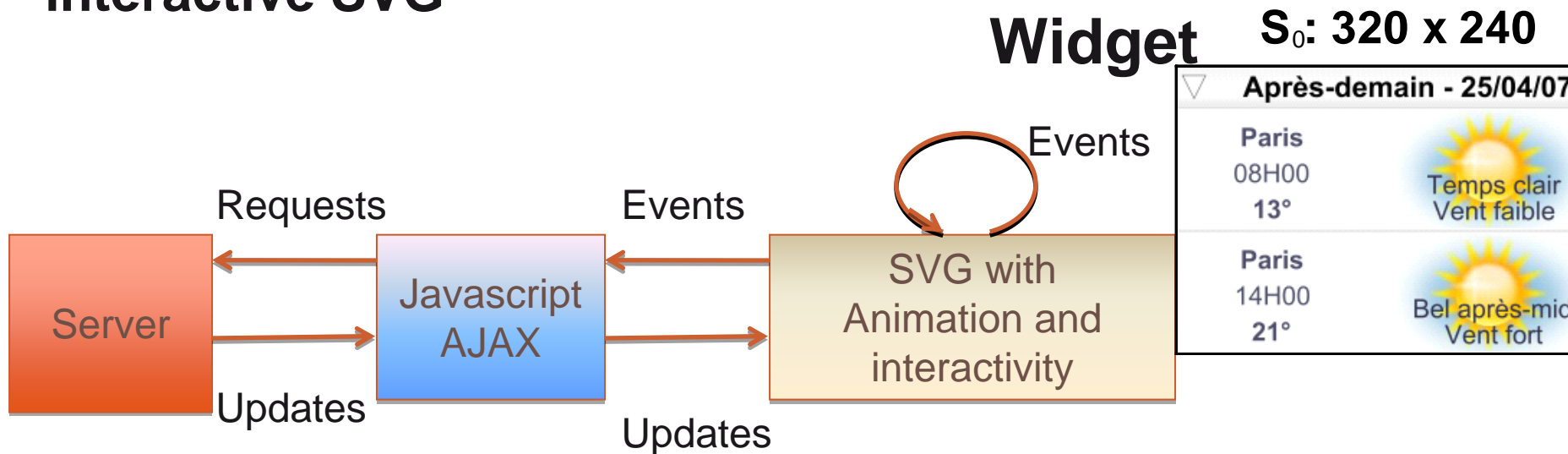
<a href="#">animate-elem-201-t.svg</a>	1.5	fail
<a href="#">animate-elem-202-t.svg</a>	1.4	fail
<a href="#">animate-elem-203-t.svg</a>	1.4	fail
<a href="#">animate-elem-205-t.svg</a>	1.4	fail
<a href="#">animate-elem-206-t.svg</a>	1.4	fail
<a href="#">animate-elem-207-t.svg</a>	1.6	fail
<a href="#">animate-elem-209-t.svg</a>	1.5	fail



pass	skipped
pass	skipped
pass	skipped
fail	skipped
pass	skipped
partial	skipped
pass	skipped

## Example 2 Widget

- A widget updated from a server using javascript code (AJAX) and displayed with an animated and interactive SVG



Asynchronous, distributed, events-driven processes can be difficult to debug and test

Sources of problems: server, network, script, script interpreter, svg, svg player

# Distributed multimedia





- **MPEG-7**
- **MPEG-21**
- **W3C**
- **SWS => ontologies**
- **Description, discovery, composition**



# Tendencies and challenges

- **Tools to manage complex multimedia objects**
- **Distributed multimedia**
  - Pervasive multimedia, user-centered
  - P2P processing
- **Semantics**
  - For documents
  - BUT ALSO FOR MULTIMEDIA PROCESSING

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