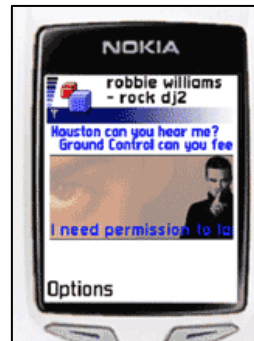


MORE: A Mobile Open Rich Media Environment



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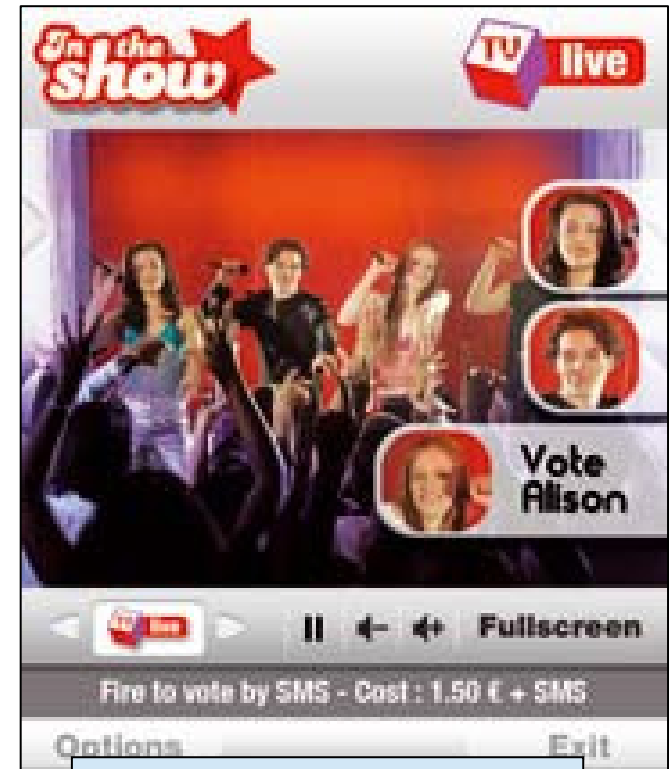
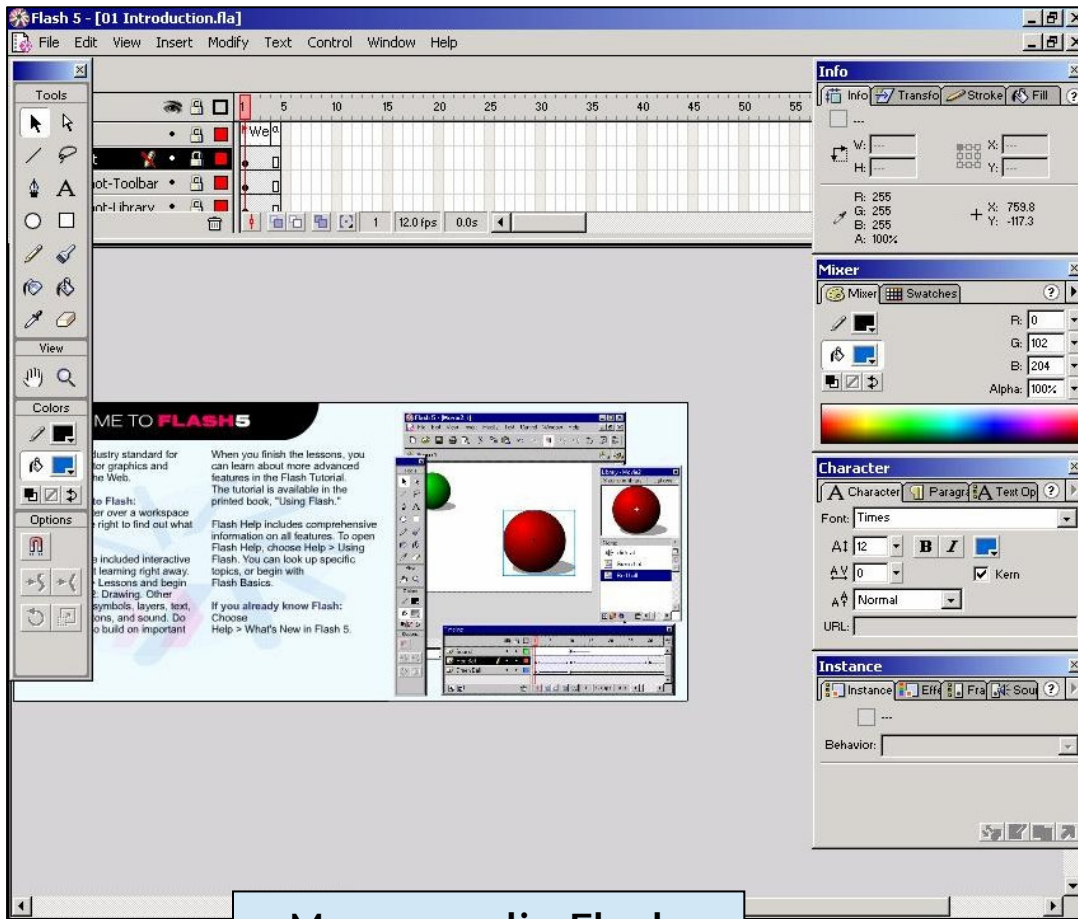
Rich Media - Some Background

Rich media content is referred to dynamic content that is graphically rich and contains compound or multiple media, including graphics, text, video and audio, delivered through a single interface

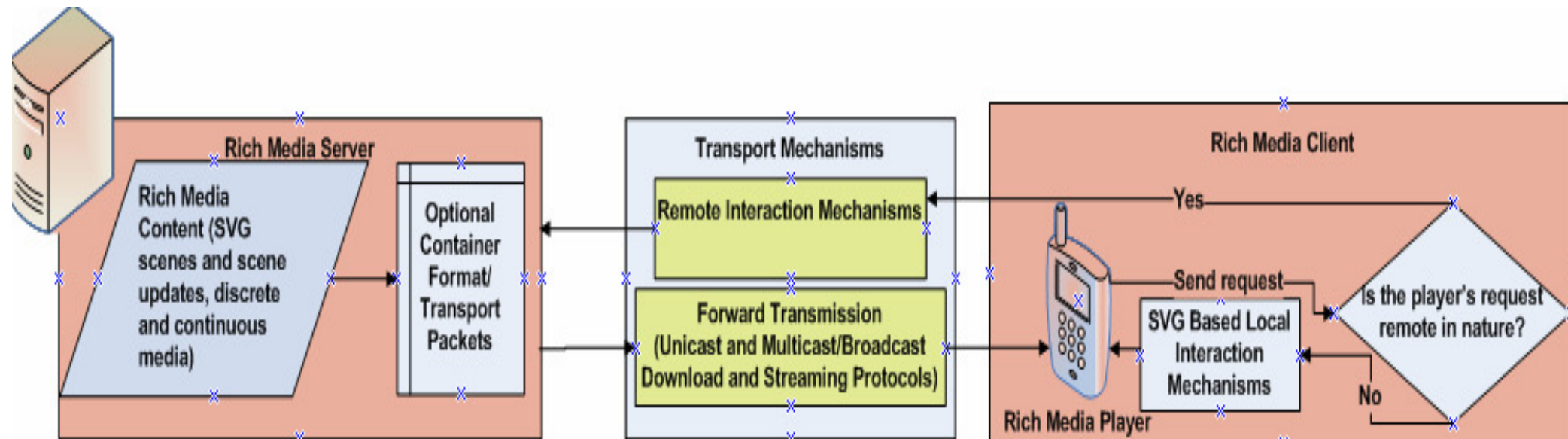
Providing a unique, richer and more compelling mobile consumer experience,

Rich media is currently a work item in both 3GPP and OMA.

Related Work

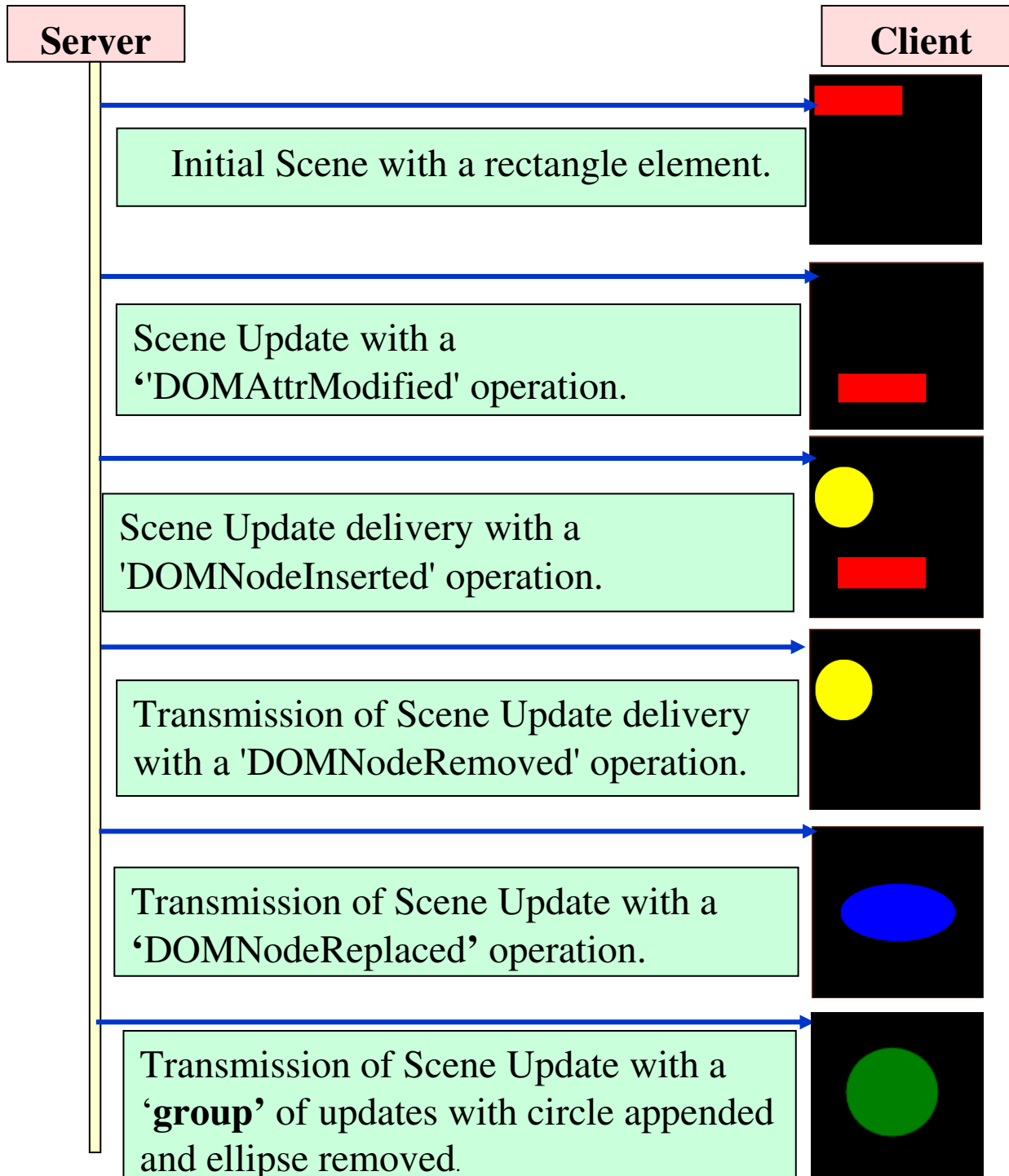


System Architecture



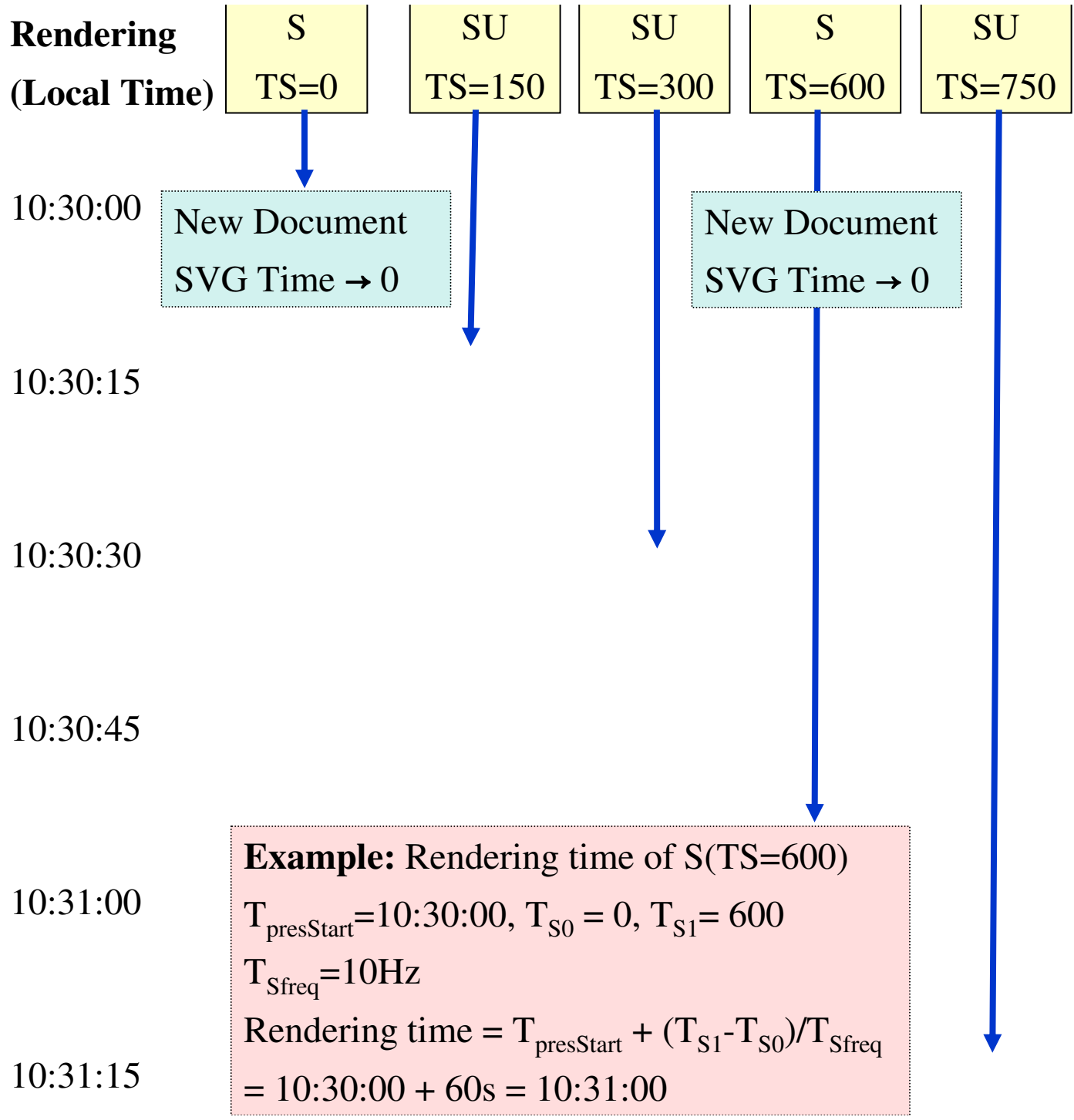
Rich Media Type

- Rich media content (scene) is dynamically updated (updates) with small changes rather than a complete document being sent every time.
- A **scene**: Spatial organization of scene elements, the temporal organization of scene elements, synchronization information, and interaction among the elements. A scene is a representation of a fully compliant SVG document that may or have been updated over time.
- **Scene updates**: Incremental updates to the SVG Micro Document Object Model (uDOM). Updates include element **addition**, element **deletion**; element **replacement** and element attribute updates. Element replacement can even be used to replace an entire scene.



Temporal Management of Scenes and Scene Updates

- Every scene and scene update sample is associated with a timestamp that refers to the time at which the scene/scene update is to be rendered on the client. The resolution of this timestamp (T_{Sfreq}) is defined by the content creator.
- For example, the timestamp of the first scene is T_{S1} and it is rendered at time $T_{presStart}$. If a succeeding scene update sample has a time stamp of T_{SU1} , it is rendered at time $T_{presStart} + (T_{SU1} - T_{S1}) / T_{Sfreq}$.



Abbreviations:
 S – Scene
 SU – Scene Update
 TS - Timestamp

Container Format

- Scenes are carried in scene tracks in ISO family files. They therefore use:
- a video media handler 'vmhd';
- a media handler type of 'sdsm' (scene description media handler);
- a derivative of the base SampleEntry in the sample description box.
- The timescale for the rich media stream should be suitably chosen to achieve the desired accuracy of timing of access units.
- Other resources may be carried in the meta-data directories of ISO files.
- Support for sync samples for tune-in, interleaving, time synchronization.

Sample Entry Format

```
class SceneConfiguration extends FullBox ('dimC'){
    unsigned int(8) profile;
    unsigned int(8) level;
    string          content_encoding;
    string          text_encoding;
    string          content_script_type;
}
```

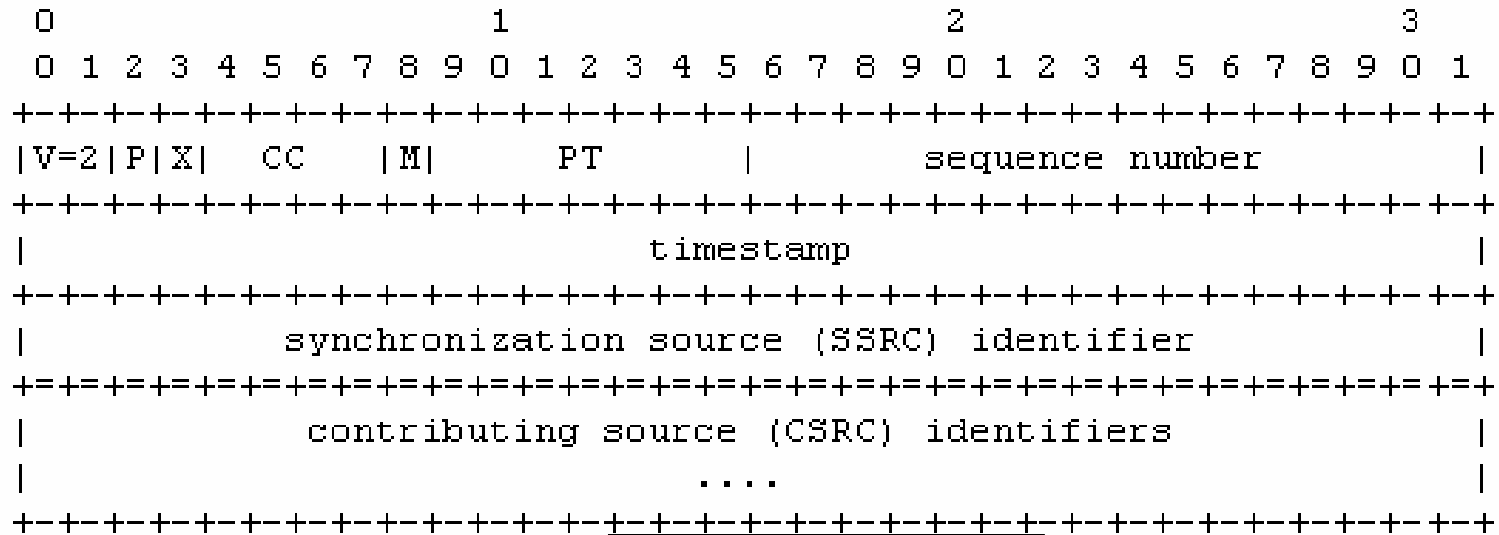
```
class MPEG4BitRateBox extends Box('btrt'){
    unsigned int(32) bufferSizeDB;
    unsigned int(32) maxBitrate;
    unsigned int(32) avgBitrate;
}
```

```
class DIMSSampleEntry() extends SampleEntry ('dims'){
    SceneConfiguration config;
    MPEG4BitRateBox ();
}
```

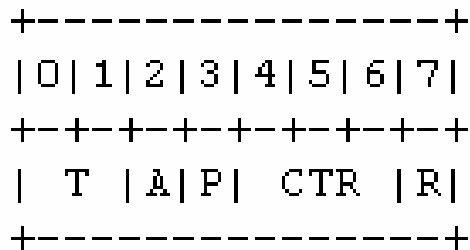
Transport Mechanisms

<u>Unicast</u>		<u>Broadcast/Multicast</u>	
<u>Streaming</u>	<u>Download</u>	<u>Streaming</u>	<u>Download</u>
Video Audio Timed Text SVG	Capability Exchange Scene Description Presentation Description Bitmap Graphics SVG Timed Text 3GP file format	Video Audio Timed Text SVG	3GP file format Binary data Bitmap Graphics Text SVG
RTP Payload Formats	HTTP/TCP	FEC, RTP Payload Formats	FLUTE (with FEC)
RTP/UDP		RTP/UDP	
IP (Unicast)		IP (Multicast)	

Transport Mechanisms



RTP Header

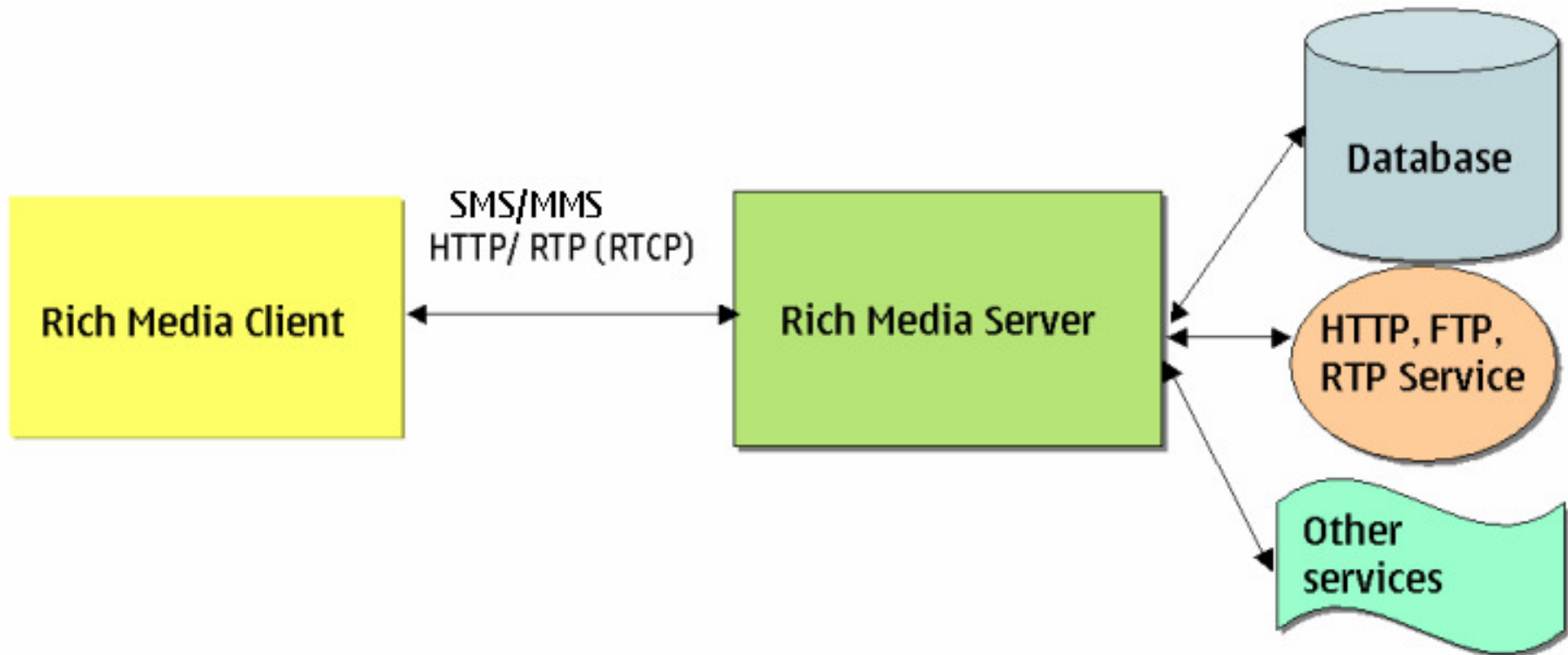


Common Payload Header

Type	Description
0	Single DIMS unit
1	Aggregation Packet
2	Fragmentation Packet

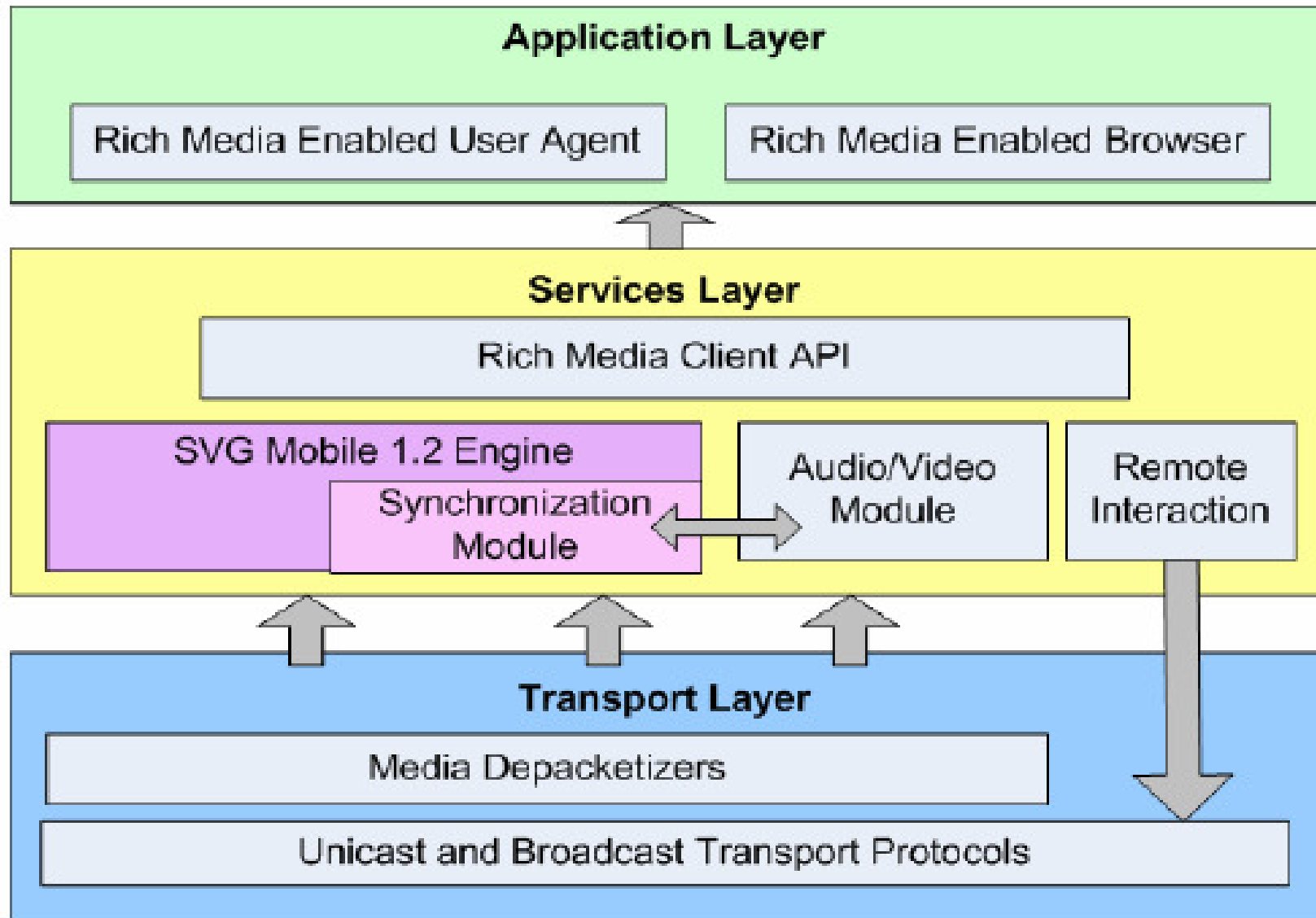
Payload Types

Interaction

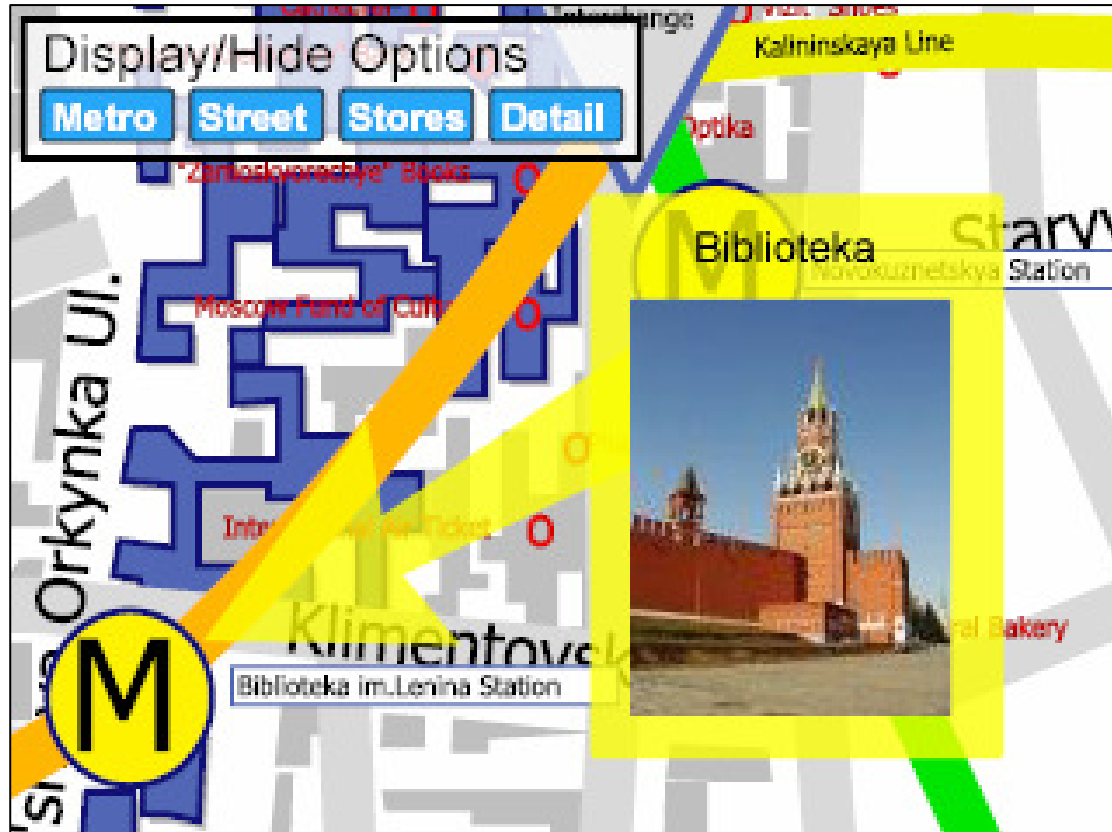


```
<metadata>; MSG_ID=1;ELEMENT_ID="my-button1";  
EVENT="click";[OCTET1.OCTET2. ... OCTETN];
```

MORE Client



Example



Reference Model Analysis (Ref: Rogge et al.)

- **Temporal Granularity:** The clock values for MORE have the same syntax as in SMIL (Synchronized Multimedia Integration Language) animation. The presentation time indicates the overall master timeline. Animations as well as embedded continuous media can have start and end times,
- **Interaction:** MORE provides additional functionality than just simple navigational interaction between documents and local media control interaction.
- **Extensibility:** MORE is based on open standards, and is not tightly bound to a particular solution, for example compression, allowing the flexibility to accommodate more optimal methods if available.
- **Reusability:** MORE supports reusability of media elements, content fragments and documents by inheriting this functionality from SMIL.
- **Adaptability:** MORE supports dynamic adaptation to preferences by using the <switch> tag borrowed from SMIL. Also, packet size and error concealment schemes can be adapted based on the network conditions, priority of content and the application.
- **Presentation-Neutral Representation:** Using SVG as the primary presentation format in MORE, a complete presentation description can be provided, independent of the rich media player.

Thanks

Reviewers and organizers of ICME 2006

Nokia Research Center Graphics and Vision Group