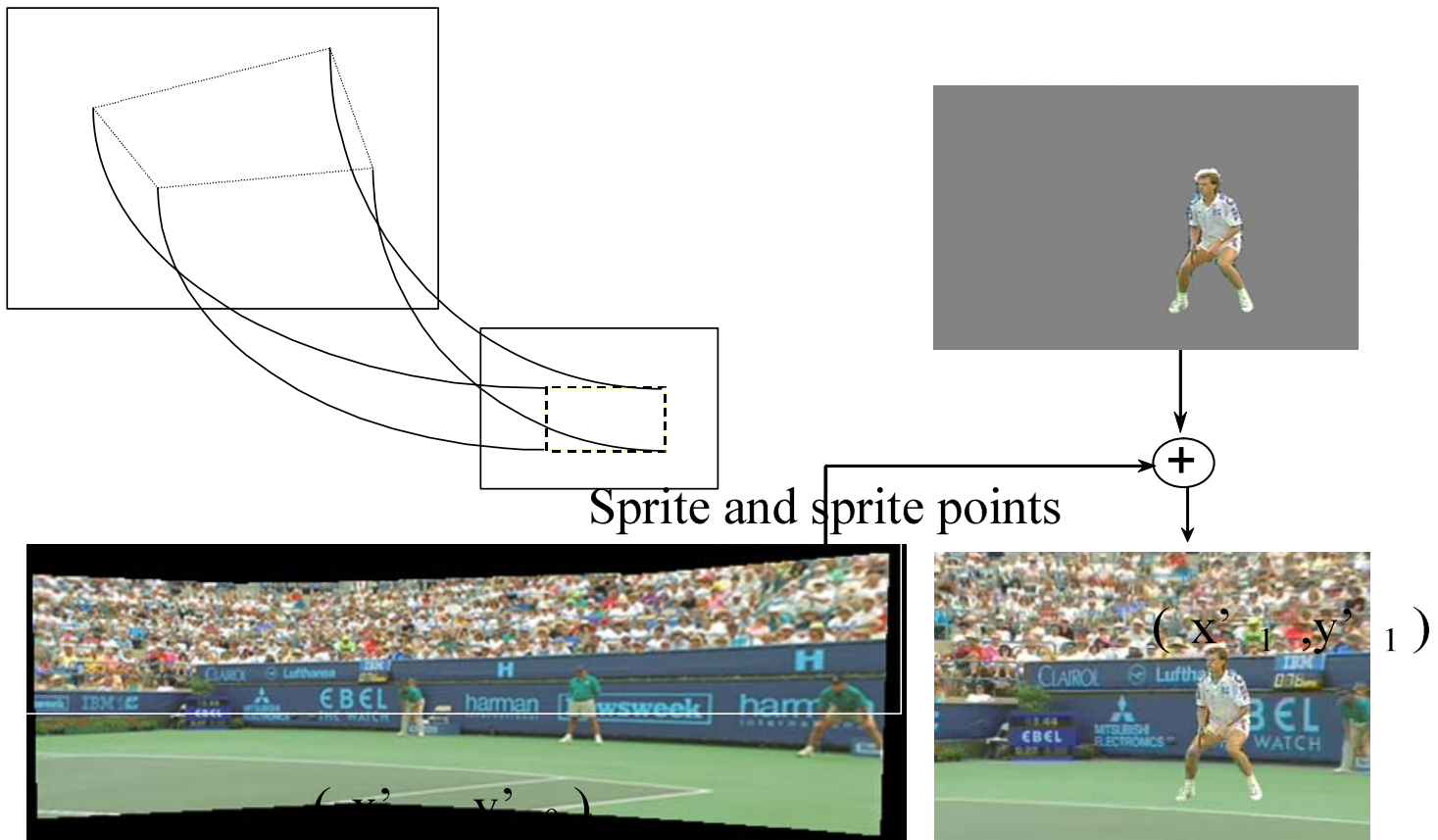


Sprite Coding:



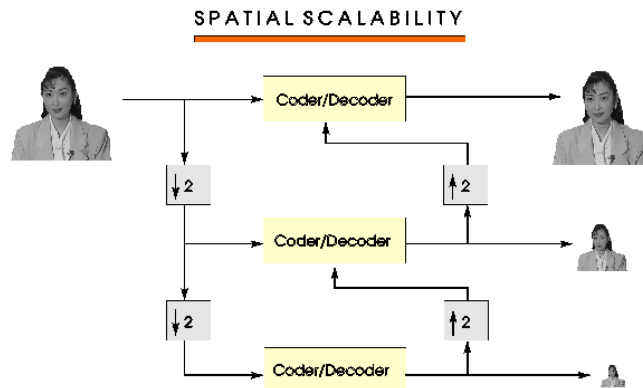
Studio Profile:

1. Higher Chrominance Formats
2. Higher coefficient ranges, non-linear quantizers, pan-scan.

- Supports 4:4:4, 4:2:2 (x'_2, y'_2)
- I-Frame only coding
- Up to 1 Gbits/s
- Binary and Gray Scale Shape Coding
- Transcoding MPEG 2/MPEG 4

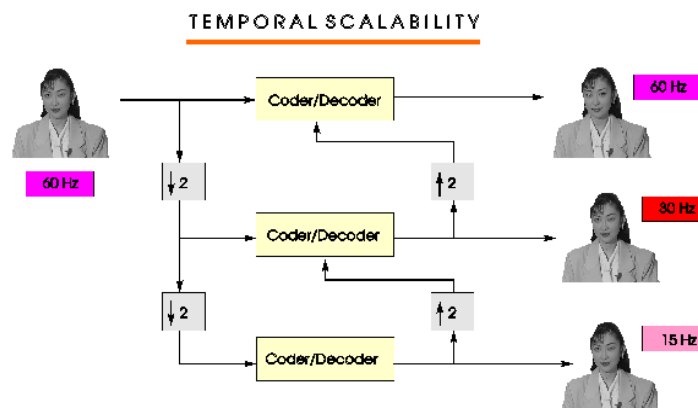
MPEG-4 Scalability Example 1:

Scalability of Objects



MPEG-4 Scalability Example 2:

Scalability of Objects



MPEG-4 Profiling Principle:

1. **Object type**
 - defines a combination of tools to create an object
2. **Profile**
 - defines a combination of object types to build a scene
3. **Level**
 - defines bounds on the complexity of collection of objects in scene *for a given profile* (e.g., max. number of objects, max. bitrate, etc.)
4. **Conformance Point = Profile@Level**

MPEG-4 Video Profiles:

1. RECTANGULAR Video Profiles
 - **Simple**
 - **Advanced Simple**
 - Simple Scalable
 - Advanced Real Time Simple
 - Fine Granular Scalability [N3904]
2. ARBITRARY SHAPED Video Profiles
 - Core
 - Core Scalable
 - Advanced Core
 - Main
 - Advanced Coding Efficiency
 - N-bit
 - Simple Studio [N3898]
 - Core Studio [N3898]

Performance Results:

1. MPEG-4 v1 Frame Based versus MPEG-1

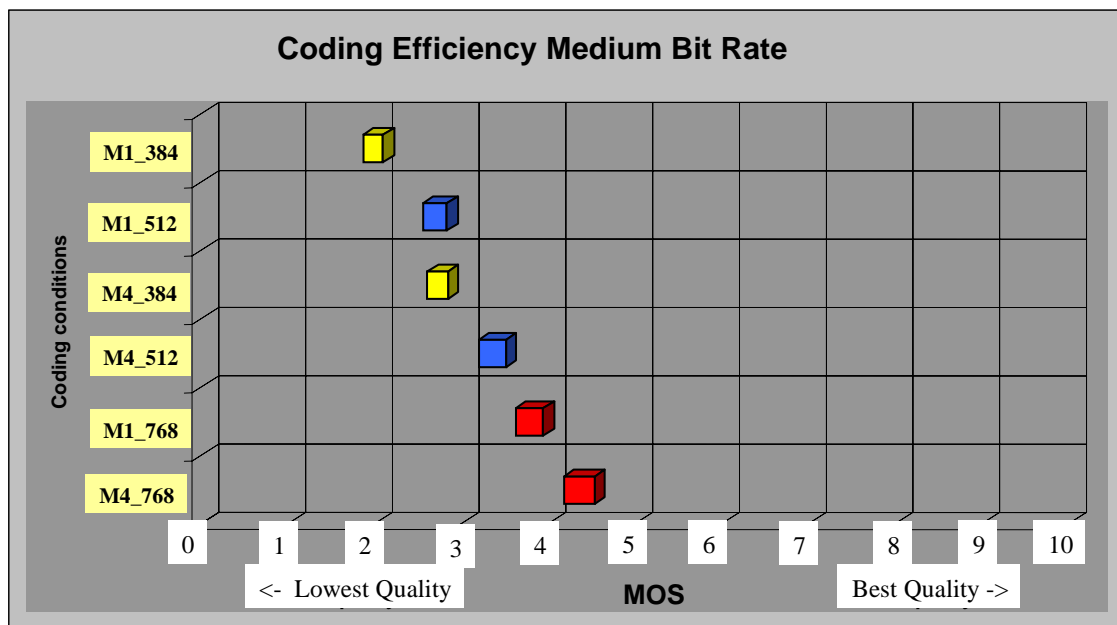
Sequence	Standard	Layer and Rate	Qp	SNR Y	SNR Cb	SNR Cr	Avg. Bitrate
Stefan	MPEG-1	single, 30Hz	17.29	28.42	34.79	34.46	995.91
	MPEG-4	combined, 30Hz		30.81	35.90	35.70	1071.18
		lower, 10Hz		30.98	35.76	35.55	472.74
New York	MPEG-1	single, 30Hz	9.20	32.73	40.17	42.35	1000.41
	MPEG-4	combined, 30Hz		35.53	40.12	42.05	1053.96
		lower, 10Hz		35.22	39.77	41.78	430.41
Table Tennis	MPEG-1	single, 30Hz	8.40	32.83	40.25	39.67	1000.32
	MPEG-4	combined, 30Hz		34.98	41.25	40.10	1019.79
		lower, 10Hz		34.77	41.00	39.86	472.93

2. MPEG-4 v1 Frame Based versus MPEG-2

Sequence	Standard	Layer and Rate	Qp	SNR Y	SNR Cb	SNR Cr	Avg. Bitrate
Bus	MPEG-2	single, 60Hz	12.96	29.99	37.58	39.73	3.00Mb
	MPEG-4	single, 60Hz		30.29	37.80	40.08	3.00Mb
HorseRace plus text	MPEG-2	single, 60Hz	13.18	29.99	33.75	37.32	3.00Mb
	MPEG-4	single, 60Hz		34.81	35.63	38.97	3.03Mb
Carousel	MPEG-2	single, 60Hz	11.22	28.10	32.85	33.15	3.00Mb
	MPEG-4	single, 60Hz		28.33	33.07	33.35	3.01Mb

MPEG-4 vs MPEG-1 Subjective Tests

- MPEG-1 (M1), MPEG-4 (M4); (Yellow, 384 kbps), (Red, 768 kbps), (Blue, 512 kbps)
- Single Stimulus (SS) Test



MPEG-4 Video in Commercial Media Players:

1. Apple QT 6.0 supports encoding/playback of Simple profile MPEG-4 video
2. Real announced their support for MPEG-4 video
3. Windows Media supports encoding/playback of ISO MPEG-4 video V1
4. Experimental MPEG-4 Im1 Player supports MPEG-4 video and H.263

