RTT TECHNOLOGY TOPIC
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The wireless web

In previous **HOT TOPICS** we have tracked how the traffic mix has changed/is changing from a predominantly voice based medium to a mix of voice and non-voice products - the traffic mix shift.

Voice Text Image Video File Transfer		Increase % of non-voice products

We have also shown how six industries are converging - computer, consumer electronics, IT, wireless, wireline, TV, with the Internet and worldwide web as the point of intersection.

Computer	Consumer Electronics	IT	Wireless	Wireline	TV
					
Internet / Worldwide Web					

Convergence is creating a new mix of content on the web - 'the web mix shift'.

When we talk about the world wide web we tend to think of the web as we know it today - predominantly a text and image based medium with a modest amount of audio and video streaming - relatively simple content requiring relatively simple delivery.

Consider the components of web based, web generated content:

Media Components	**Quality Index**
Teletext/Graphics	Resolution
Audio	Fidelity
Image	Resolution, Colour Depth
Video	Resolution, Colour Depth, Frame Rate
Applications	Latency
Increase % of audio, image and video streaming and application	
Streaming in web based media (including web based content capture	

platforms)

Consider the impact of digital cameras combining fast imaging (video streaming) and audio capture.

Consider the impact of world wide web and digital TV convergence.

The percentage of audio, image and video and application streaming is increasing over time. At the same time, user expectations of quality - resolution (text/graphics), audio fidelity, image resolution and colour depth, video resolution, colour depth and frame rate and application latency are increasing.

Content is becoming more complex. As content becomes more complex not only do we need more bandwidth, we need better quality bandwidth. The **dynamic range** of the bandwidth goes up (the frame to frame bit rate ratio) - an underlying trend with profound implications for 3G network design.

Network Integration

Which brings us back to defining a 3G network or rather defining a network topology which combines the elements of a computer network, IT network, wireless network, wireline network and TV network.

Given our assumption that we are going to be seems more video and application streaming in next generation networks, a logical starting point would be to look at the options for world wide web/digital TV integration.

W3C/SMPTE and DVB Standards Integration

Web standards are developed by the world wide web consortium (W3C). With the W3C, a web TV interest group is presently working to define standards for web enhanced digital TV. A vendor forum, the AVTEF - Advanced Television Enhancement Forum is promoting the adoption of an HTML/XHTML based enhanced television format (Microsoft and Intel are lead players in the forum). In parallel, the Society of Motion Picture and Television Engineers are trying to establish a standard for 'declarative' content - content which is tagged in such a way that it can announce or declare its requirements.

W3C		SMPTE Society of Motion Picture & Television Engineers	DVB/3GTV
AVTEF (Advanced Television Enhancement Forum)	IETF Synchronised Multimedia Integration Language + IETFRTP (Real Time Protocol)	Standard for Declarative Content	MPEG4 / MPEG 7

In parallel, the DVB and MPEG (digital video broadcasting and motion picture experts group) standards communities are producing similar (but presently incompatible) tagging standards.

The assumption is that ATVEF/SMPTE and DVB standards integration can be achieved by using IP Multipoint Encapsulation as a common bearer - IP comes to the rescue of the disparate standards making process!

At the application layer, the IETF SMIL protocol (synchronized multimedia integration language) looks after the synchronisation of different media components and the IETF RTP protocol (real time protocol) managing the synchronisation of multiple traffic streams as they move into and through an 'IP network'.

The idea of web enhanced TV is to support the insertion or overlay of a web page on TV, or the planning of TV on a web page. The AVTEF processes a system of announcements and triggers that provide access to content enhancements - sometimes described as B-XMOL (broadcast XML).

We said that the concept of declarative content is that the web page can announce it's requirements. In the AVTEF proposal, receivers are required to supply 1 kb for session cookies and a minimum of megabytes of memory for cached simultaneous content.

Note that interactive TV does not need to be two way - cached content sent in parallel with the transmission can be accessed inter-activities - the illusion of inter-activity (how teletext works today). Note also that in a two way network, the large number of uplink requests responding to broadcast triggers can present a major problem (solved by locally caching the content) - trading memory against delivery bandwidth.

ATVEF - TV Broadcast Content Structure

Service Event Component Fragment	Service Event Component Fragment	Service Event Component Fragment	Service Event Component Fragment
↓	↓	↓	↓
Concatenation of programmes from a service provider (analogous to a TV channel).	Single TV programme	Constituents of an event - Audio/video stream, Embedded web page, Multiple Language Support (sub-titles or voice-overs).	Sub-part of a component, eg video clip.

The ATVEF defines a TV broadcast structure made up of 4 elements - the service - a concatenation of programmes from a service provider (analogous to a TV channel), an event (a single TV programme), a component (an audio/video stream or enhanced web page or sub-titles) and a fragment (for example a video clip).

Note that much of the content will be source coded using MP4 and probably tagged

using MPEG7 (The Motion Picture Experts Group Multimedia Content Description Interface Standard).

Whether you use MPEG tagging or AVTEF tagging (AVTEF triggers), the important point is to decide whether you make the content device aware or the device content aware.

Two Options

1. **Make the content device aware.**
   Two problems with this - one, the link is not always two way so there is no way to learn a device's identity; two, there are so many device hardware and software form factors that the transcoding would have to have almost infinite complexity (ie wouldn't scale).

2. **Make the device content aware.**
   Much better - the only downside is that receivers have to have memory available to download session cookies which establish the requirements for the 'session download'.

An end user experience goes something like this. He/she starts to download a session which is (what would today be called) a TV programme or traditional TV sourced content. Announcements highlight additional information available relating to the content. Subsequent triggers will link you to this content (which will typically be windowed on the screen). Provided an uplink is also available, the subscriber can also contribute to the content (simultaneous chat groups) for example or subscriber led - subscriber generated storylines.

What does this have to do with 3G wireless? Well, what we have just described above is a new form of broadcast media. (Not that new actually, more an evolution from existing closed caption, text mode, teletext or sub-title systems). As such, it is directly analogous to SMS or coded data channels in IMT2000.

Note particularly though that it is the **uplink** that delivers the value implicit in the transaction - the egocentric value model.

The impact on 3G wireless will be as follows:

User expectations will contend to change over time. The web mix shift will mean that web based content will move from a text and image based medium towards true multi-media, accessed from an integrated 3G/DVB appliance - (the 3G PC) - a complex content capture device - the basis for the wireless web.

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We aim to introduce new terminology and new ideas to clarify present and future technology and business issues.

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Contact RTT

RTT, the Shosteck Group and The Mobile World are presently working on a number of research and forecasting projects in the cellular, two way radio, satellite and broadcasting industry.

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