



The Growth of Web 2.0 Services

Adapting Web 2.0 content for mobile devices

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Over recent years the web has seen the growth of so-called "Web 2.0" services based around the concept of a two-way information flow, and the empowering of individuals to create and publish their own content and information through blogs, wikis, video sharing, and social networking services. Video content is often central to these services, allowing the uploading and sharing of content generated by customers, along with the emergence of video advertising on the web.

Access to video content from a wider range of devices including mobile phones, set top boxes, and games consoles is the next logical step, but providing these services with the best possible quality can be problematic. Mobile devices generally have additional constraints regarding the type of content they can support due to CPU, screen size, and power limitations. In contrast to PCs where new codecs and media players can be easily installed or embedded into web browsers, many phones can support only a limited set of standardized codecs as the decode and playback functions are coupled with hardware capabilities in the phone in order to reduce power drain.



The obvious solution to this dilemma is to employ offline transcoding solutions coupled with a content management platform to convert the source content into a range of formats appropriate for the mobile devices and network access speed used by customers. This will probably involve changing the codecs used for audio and video compression but can also involve modifying the video frame size, frame rate, and bit rate so that it can be properly played back. These files are then accessed by the mobile devices via a streaming server since in the majority of cases mobile phones do not have the storage capacity to hold and play back large media files as would often happen on PC/broadband devices.

As the range of mobile devices is constantly expanding, and the capabilities of these devices increasing, it's often necessary to transcode an item of content into a wide range of formats in order to offer the best quality experience to the service subscribers. This can range from low bit rate, small frame versions of the file using basic codecs such as H.263 to versions of the content targeted at more advanced phones that can support H.264 with larger image sizes over fast network connections such as HSDPA. This "breadth" in terms of device capabilities and network access rates is likely to become broader over time rather than narrower as new devices are being launched constantly while old handsets stay in use for a number of years.

Using offline transcoding can be effective when the number of devices to be supported is small and the range or churn of content is low. However, when the range and diversity of content sources become very large, this method can quickly become unmanageable. For example, a large video-sharing site may typically receive 10,000 new items each day. If this is to be delivered in one of 15 different formats, depending upon the mobile devices and network

speeds to be supported, then this represents as much as 7,500 hours of transcoded content that will require a significant server farm and storage to process and retain as well as the necessary streaming platform to deliver this content to the end devices. Typically, only a small percentage of these output files are ever accessed by customers (research has shown around 5%), or many of the subscribers will access from only a small subset of mobile device types, meaning that much of the effort consumed in transcoding content was in effect wasted.

Organizations such as Content Distribution Networks that want to extend services to reach into mobile access markets have an even greater challenge as content must be available shortly after it is uploaded. This calls for a different approach: instead of transcoding media as it is uploaded into the system, a method of "Just in Time" transcoding can be used. Instead of converting content into all of the required formats when it is uploaded, the content is transcoded based on demand for specific content by a subscriber and streamed directly to their device. The format for the media delivered to the subscriber can be tailored to the device in use and its network connection to offer the best possible experience for the subscriber.

This approach places additional demand on the transcoding system since it must not only be capable of carrying out high-quality media adaptation, but it must do this in a very time-efficient manner to ensure that the customer can receive media quickly after they have made a request for a given item of content. The conversion must be carried out in real time or better to ensure that a steady flow of media traffic is streamed for playback.

However, this is a much more efficient and scalable solution: content is only adapted into the formats that have been requested by customers and can be efficiently delivered to the customer's device (eliminating the need for a separate streaming platform). The resulting transcoded files may then be cached for subsequent re-use, further optimizing storage and server requirements.

Once this type of infrastructure is in place, further enhancements to services can be developed, for example, the ability to mix and match content from a variety of sources can be used to provide pre- and post-roll ad-insertion that is targeted to individual customer profiles. In addition, content may be watermarked or overlaid with news, information, or promotional banners to further enhance the customer experience and enable new possibilities for customer interaction.

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