

Quality of Experience

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AWTG
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Quality of Experience

What is it ?

Quality of Experience Analyser

Demonstration

Quality of Experience (QoE)

In terms of the network operator, the quality of experience is the ultimate measure of how subscribers perceive the performance of the network and its services. A poor user experience will result in dissatisfied customers, leading to a poor market perception and ultimately weakening of the brand.

Market perception: An Example

From Times Online

October 5, 2009

Hopes fade of an iPhone price war

Nic Fildes

It has been almost two years since Apple's iPhone first hit the shelves but the euphoric response to news that Orange and Vodafone will soon be stocking the device demonstrates that the handset has lost none of its allure for consumers.

With Orange launching the iPhone before Christmas and Vodafone hot on its heels in 2010, there is no doubt that the device is set to go mainstream.

However, those customers that have been holding off buying an iPhone in the hope of a massive price cut look set to be disappointed.

Andrew Harrison, chief executive of Carphone Warehouse's UK operation, said: "I am not convinced there will be a price war. That is a game that only leads in one direction and that is all of them losing. This battle will be fought on other fronts."

RELATED LINKS

- ▶ Orange on brink of UK iPhone deal
- ▶ Vodafone comes in from

One of those fronts will be network quality with some O2 customers unhappy with the performance of the company's network when using an iPhone.

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Improving the QoE will improve customer loyalty and enable the network operator to maintain a competitive edge.

Which Software ?

The most important piece of software on your computer

The Web browser has become the most-used interface with a typical user performing over half their tasks using a Web browser.

The browser is where we are headed (for better or worse)

- Browser based interfaces (email, antivirus, admin, etc)
- Software written to be viewed through a browser

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Quality of Experience Analyser



What is it?

The Quality of Experience Analyser is a tool for providing accurate, real time monitoring and analysis of what actual users are experiencing on their end of a web browser.

Why is needed

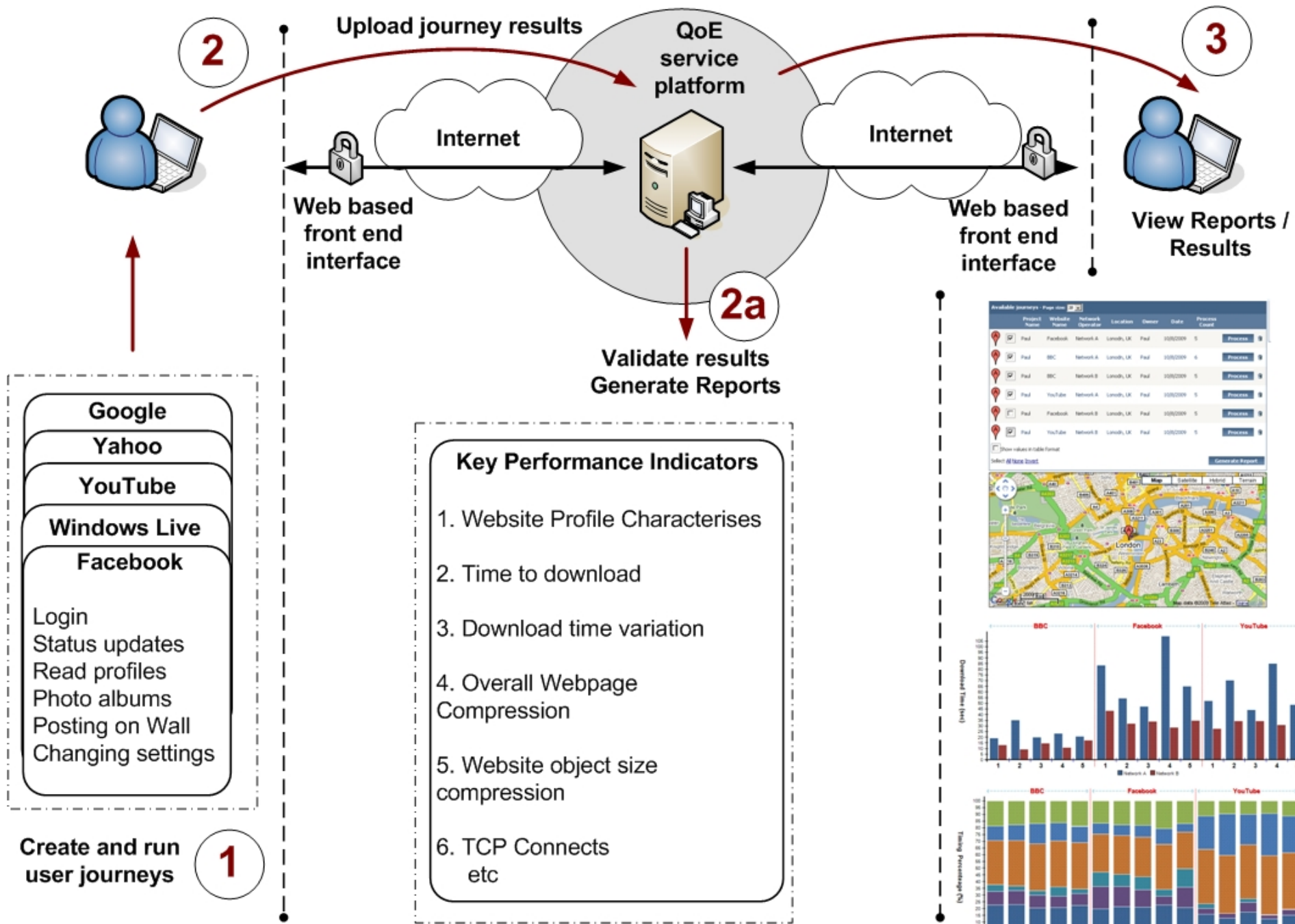
Other tools available on the market (such as tames, nemo etc) provide Information with respect to the lower layers (link, transport and network). Although this information is beneficial in optimising the network performance, the impact it has as well as the improvement it provides (to the end user experience) is not known and can not be assessed using these tools.

Quality of Experience Analyser



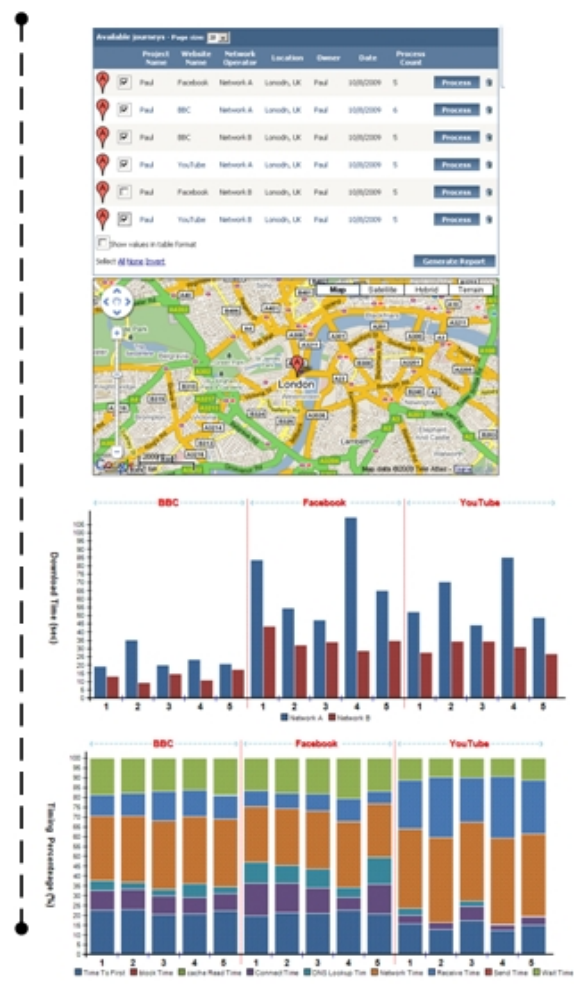
Benefits

- We provide the full picture of your customers web browsing experience by testing a comprehensive number of key performance indicators (KPIs)
- Learn how your customers web browsing experience compares to your competitors and where it needs improving.
- Delivery of results, benchmarking and detailed reports available on the web through a secure login web interface.
- We are able to measure the web browsing experience of any website. In addition, we provide a customised solution in which specific parts of the website performance can be assessed. Example: downloading a specific type of video from youtube.



- Google
- Yahoo
- YouTube
- Windows Live
- Facebook
- Login
- Status updates
- Read profiles
- Photo albums
- Posting on Wall
- Changing settings

- ### Key Performance Indicators
1. Website Profile Characterises
 2. Time to download
 3. Download time variation
 4. Overall Webpage Compression
 5. Website object size compression
 6. TCP Connects etc



Flexibility: Customising Journeys



- QoE supports the latest technology of AJAX based websites.

- Ability to analyse a specific section of a Website. Example: The main video part of a youtube page

The screenshot shows a YouTube video player interface. The video title is "Diversity - Final - Britains Got Talent 2009 (HQ)". The video player is highlighted with a red circle. Below the video player, there are social sharing options for Facebook, Bebo, and MySpace. There are also statistics and data sections, including "Video Responses (14)" and "Text Comments (16,536)".

The chat window shows a user's online status as "You are Online. Go Offline". A message from a user named "agentBro..." asks "What are you doing right now?". There are 4 online friends listed at the bottom.

Featured Videos

Key performance indicators

- 1. Download time:** This KPI is used to find the total time to download a page(s). It shows the total time in seconds from the start of the first html request to the last request.
- 2. Variation in download time:** This KPI shows the variability or dispersion of the download times.
- 3. Bytes Received:** This KPI shows how much content was received (Kb). This information can give an indication of how much content is compressed by different operators. Compression is one of the factors that is directly linked to the page loading time.
- 4. Bytes Received - Content Type:** This KPI shows the received size of each content type. This gives a deeper analysis indicating which content type was compressed more effectively.

Key performance indicators

5. TCP Connects : This KPI shows the number of HTTP initiated TCP connections required to download a webpage.

6. Streaming Video Interruption : This KPI shows the download times of a progressive video download. In this test we are looking to find instances where the video was interrupted (i.e. when the user experienced buffering problems). Frequent video interruptions indicate a negative user experience.

7. Average Goodput: This KPI shows the application level throughput. The goodput is generally lower than network access connection speed (the channel capacity or bandwidth).

Key performance indicators

8. HTTP timing: This KPI shows the different timing phases present in the HTTP requests. **Block --> DNSLookUp --> Connect --> Sent --> Wait --> Receive --> CacheRead**

- **Block:** Time spent waiting for a network connection to become available
- **DNSLookUp:** Time to resolve a host name
- **Connect:** Time taken for a new TCP level connection to be established
- **Send:** Time required to send the HTTP request message to the server
- **Wait:** The idle time taken to receive a response message from the server.
- **Receive:** Time taken to receive the response message from the web server
- **CacheRead:** time taken to read the content from the browser cache during 304 responses.

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Setting new standards for wireless services

specifically offers

- 3G/HSDPA Design and Optimization
- 3G end to end network Management
- RF & Transmission Design
- VoIP expertise
- Drive test team including vehicles and tools
- WiFi & WiMax design and deployment
- Benchmarking & statistical analysis
- Consultancy on Future Wireless Networks
- Network Audit
- Training Courses (3G, HSDPA, WiMax and Future Wireless Networks)

► [Quality of Experience Analyser](#)

The Quality of Experience Analyser is an advanced tool for providing accurate, real time monitoring, testing and analysis of Web Browsing. Other tools available on the market (such as tames, nemo etc) provide information with respect to the lower layers (link, transport and network). Although this information is beneficial in optimising the network performance, the impact it has as well as the improvement it provides (to the end user experience) is not known and can not be assessed using these tools. The QoE is a complementary tool that monitors the application layer and gives an accurate in depth description of what actual users are experiencing on their end of a web browser.

Login to Quality of Experience Analyser

Email address (ex. user@example.com)

Password

Remember me on this computer

[Login](#)

◆ [Need to Register?](#)

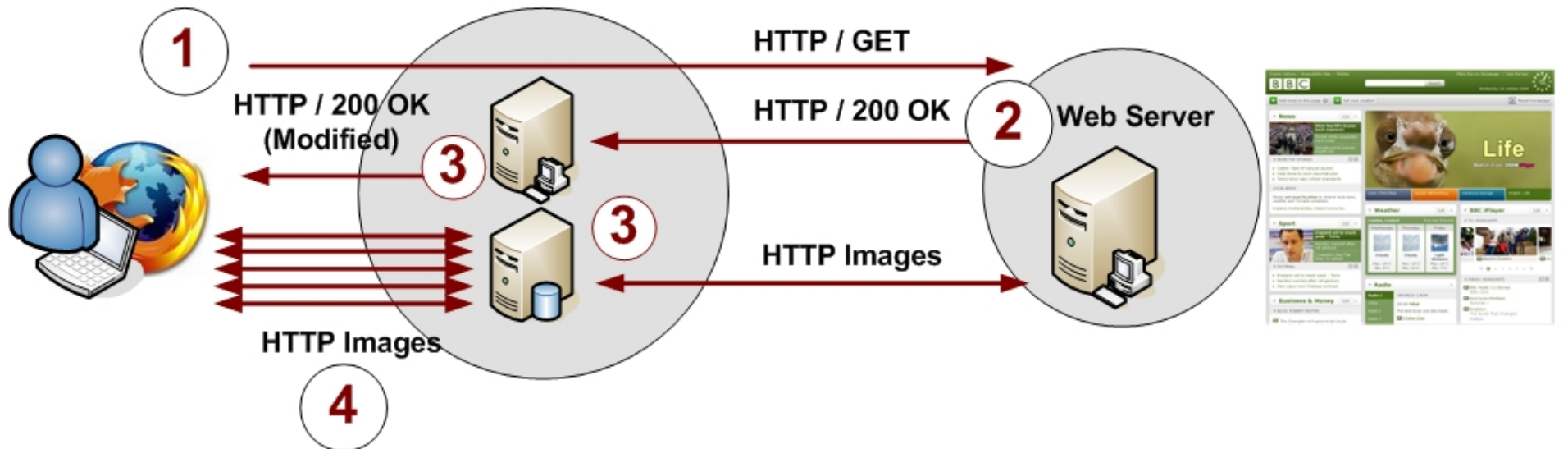
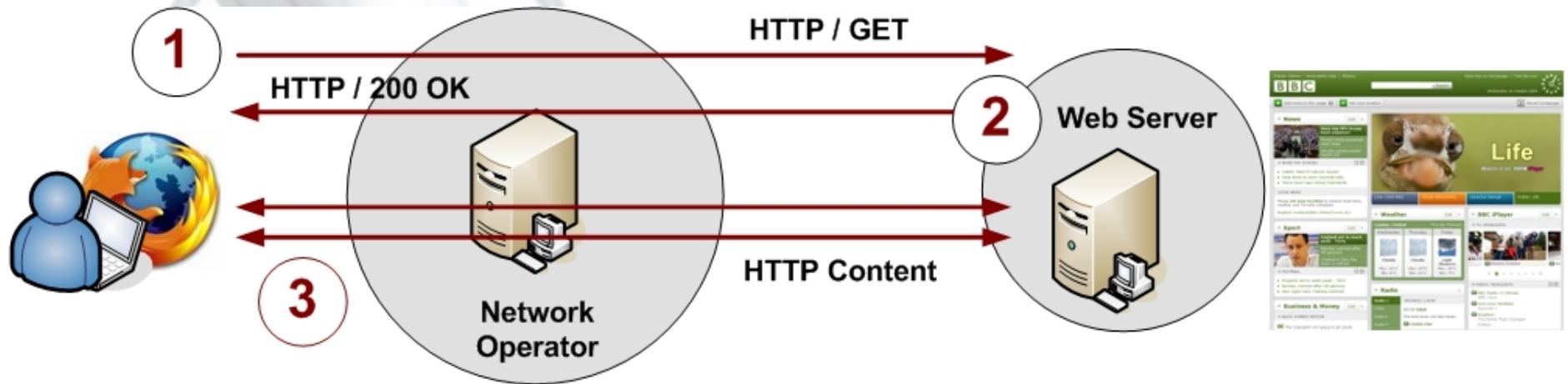
◆ [Forgot Password?](#)

KPI: TCP connections

An unusual high number of TCP connections are observed when downloading WebPages using network G.

KPI: TCP Connects	Network H			Network G		
Google	2	2	2	4	0	4
Facebook	3	3	3	8	8	8
Ebay	10	0	0	10	24	25
Youtube	16	13	15	21	36	28
BBC	2	2	2	18	19	18

KPI: TCP connections



The HTML source code of images

BBC webpage source code obtained by client on Network H

```

<img src="/home/release-13-6/img/new_logo.png"
<img src="/home/features/d/content/images/2008/06/25/glastonbury_2007_corinne_bailey_rae_400x260.jpg
src="/feedengine/homepage/images/news/_44783243_crowd_ap226i_146x110.jpg
src="/feedengine/homepage/images/_44782264_murray226x170_146x110.jpg"
src="/feedengine/homepage/images/sport/_44783173_xavi226170gett_146x110.jpg
<img src="/home/release-13-6/img/cbbc.png
<img src="/home/release-13-6/img/cbeebies.png
<img src="/weather/images/symbols/57x57/14.gif
<img src="/weather/images/symbols/57x57/7.gif
<img src="/weather/images/symbols/57x57/14.gif
src="/feedengine/homepage/images/iplayer/b00cbmb1_150_84_146x82.jpg
src="/feedengine/homepage/images/iplayer/b00cb10y_150_84_146x82.jpg
src="/feedengine/homepage/images/iplayer/b00c8196_150_84_146x82.jpg

```

BBC webpage source code obtained by client on Network G

```

<img src="http://1.2.3.13/bmi/www.bbc.co.uk/home/release-13-6/img/new_logo.png
<img src="http://1.2.3.10/bmi/www.bbc.co.uk/home/features/d/content/images/2008/06/25/glastonbury_2007.jpg
src="http://1.2.3.13/bmi/www.bbc.co.uk/feedengine/homepage/images/news/_44783243_crowd_ap226i_146x110.jpg"
src="http://1.2.3.10/bmi/www.bbc.co.uk/feedengine/homepage/images/_44782264_murray226x170_146x110.jpg
src="http://1.2.3.11/bmi/www.bbc.co.uk/feedengine/homepage/images/sport/_44783173_xavi226170gett_146x110.jpg
<img src="http://1.2.3.9/bmi/www.bbc.co.uk/home/release-13-6/img/cbbc.png
<img src="http://1.2.3.10/bmi/www.bbc.co.uk/home/release-13-6/img/cbeebies.png
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<img src="http://1.2.3.10/bmi/www.bbc.co.uk/weather/images/symbols/57x57/7.gif
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src="http://1.2.3.13/bmi/www.bbc.co.uk/feedengine/homepage/images/iplayer/b00cbmb1_150_84_146x82.jpg
src="http://1.2.3.11/bmi/www.bbc.co.uk/feedengine/homepage/images/iplayer/b00cb10y_150_84_146x82.jpg
src="http://1.2.3.9/bmi/www.bbc.co.uk/feedengine/homepage/images/iplayer/b00c8196_150_84_146x82.jpg

```

Thank you

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