



Whitepaper: The online slowdown

The problem, the causes, the solutions and what your business needs to do to keep moving

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The Issue – Victim of its own success

Knowledge is power and the internet information super highway has empowered us all. It gives us unprecedented access to information from around the globe and truly revolutionises the world we live in. With the internet the global village has become a hamlet - a connected hamlet.

What could be better? One word – broadband. What is better than the internet is even bigger internet. The evolution of the broadband era has taken the power of the Web to a new level. Our capacity to educate, learn, communicate and enjoy has been enhanced by the addition of highspeed video, music and graphics. The broadband age has seen the rise of YouTube and the arrival of on-demand TV streaming.

However, such has been the demand for video content that the internet has struggled to keep up. YouTube's own capacity demand now is equal to the entire internet around the time of the millennium. And with consumer demand increasing the issue is set to get more challenging unless action is taken.

The Problem – Keeping Up

It is a familiar scenario: we need more space, so we will add more space, then we expand our habits to fill it and once again we need more space. This is a problematic circle that can be attributed to a number of different areas of life, consider home buying or motorway construction, and certainly it has been the case for the internet super highway.

There was a time when telephone purpose cables and dial-up internet connections were all that were needed to get us speeding along the super highway. But then, when the internet's popularity took off and its massive potential started to be fully realised, we needed more capacity.

Along came broadband (the cyberspace equivalent to expanding the M6 from 6 lanes to 66 lanes). We could once again speed along the highway but this time in huge trucks full of wonderful cargo such as music and film downloads, online games and other capacity greedy items. Now, however it seems as though our vast broadband super highways are once again clogging up, this time with juggernaut traffic jams.

The new challenges

Social video clips

The doomsday advocates say that our insatiable appetite for online video watching will break the internet by about 2010. Even though this is overstating the case somewhat it does nevertheless highlight the need for action from the internet community. As stated above, YouTube now takes up a staggering amount of internet capacity and its popularity show no sign of abating. In fact, now that Google has bought the video streaming site, plans are being worked on to expand its potential further. ISPs be warned!

Online TV on demand

A relative of sorts of the YouTube phenomenon, online TV repeats is another internet video streaming genre that is ferociously eating up bandwidth capacity. Here in the UK, Channel Four started the ball rolling with its '4oD' which translates to 4 on demand. Now most of the major UK broadcasters offer online repeats of their most popular programmes. ITV has 'Catch up', Channel Five offer 'Demand Five' and the BBC has 'BBC iplayer', which had a reported 3.5 million programme downloads in its first two weeks after launch (according to the BBC website).

Online TV repeats have proven to be hugely popular because they give the power to the viewer to watch when they want to watch. However, the demands on internet capacity are considerable, in fact often more demanding than with YouTube because the video streams are longer.

Online Communications

Ironically the communications industry has come full circle. Originally the internet ran on cables designed for telephone communications, now the frontier of the voice communications sector is using broadband technology. VoIP applications such as Skype are becoming very popular because they offer cheaper 'calls' and the added benefit of video calling. Again, this takes up a great deal of capacity however. Additionally, mobile communications companies are increasingly offering access to the internet through their 3G technology. All in all, the communications sector is taking up a large slice of the broadband pie.

The Solutions – intelligent management

Don't start panicking just yet. In reality the worst case scenario is that online video and VoIP streaming use will just slow the internet down to snail speeds, so essentially taking us back to the dial-up era, the metaphorical stone-age of the internet epoch. But what needs to happen to avoid this slow down?

Essentially, there are two strategies can than be employed to tackle this problem. The first is to add more capacity. The second is to improve how capacity is managed.

Adding more capacity

One key problem, it seems, is that we cannot add capacity quickly enough to deal with increasing usage demand. For example, Larry Irving, co-chairman of the Internet Innovation Alliance stated, "estimates show US internet traffic increasing at more than 50% a year, with capacity expanding at only about 40% a year." (The Observer, April 6th 2008).

Conventional wisdom puts the failure to meet capacity demand down to a lack of foresight and a lack of willingness to invest in infrastructure ahead of time. If the first is true then the benefit of hindsight will ensure that capacity is geared up to cope with the internet video era soon. As for the second, well it seems to always take the industry time to realise the commercial potential of internet developments. But they will eventually and when they do, the necessary investment in infrastructure will follow.

Measures to improve internet capacity will include the extensive deployment of fibre optic cables and the employment of what is known as 'traffic shaping'. Fibre Optic cables are far more efficient transmission mediums with the added benefit of being capable of carrying far greater 'packets' of information. Traffic shaping manages the flow of information to maximise bandwidth capacity.

However, improving transmission infrastructure is not the only area that needs addressing. High demand internet content needs powerful host processing to work. Video streaming in particular requires significant server power. So to ensure that hosting power keeps up with internet content demand providers will need to invest in top line dedicated hosting solutions.

Dedicated servers and their associated hosting solutions – load balancing and clustering – offer the hosting power for tomorrow's demand today. They deliver dedicated processing exclusive to the user's website, ensuring that their full processing capacity is brought to bear. Furthermore, associated services such as load balancing and clustering offer support services to guarantee 100% uptime and consistent top level server performance.

Improving capacity management

Many internet experts, including those at UKFast, believe that significant improvements can be made without the need to expand capacity by simply increasing efficiencies. In addition to better network organisation, touched on above, there are technologies available to manage flow rates and traffic density.

Linux Traffic Control is an open source programme that can manage broadband packet sizes, type and distribution. Traffic Control can determine and arrange the optimum packet configuration to maximise flow rates, while also managing the rate of flow to avoid congestion in the pipes. The technology is already in use and is highly regarded. Continued role out will certainly benefit the internet going forward.

In a similar vein to Traffic Control, but perhaps addressing the issue from the other side, is flexible hosting capacity. This entails varying broadband capacity at the source based on patterns of peak and non-peak demand. Website owners can set up a varying schedule with their hosting provider to increase capacity when demand is high and reduce capacity at low demand times. This has the benefit of saving on hosting costs, while also ensuring that peak demand does not overload their website and that capacity is not taken up unnecessarily.

Content catching is another way to improve broadband performance. This involves local network capture and storage of information so that it is easier for future retrieval from other local requests. Essentially, it reduces the network burden by reducing the distance the information has to travel and by ensuring the information does not have to travel along busy major network hubs.

Then there are fair use policies that can be implemented. Quite simply these are regulations set by the provider to limit the amount of use by the end user. Such policies have become extremely prevalent in the broadband sector, partly as it is an easy to implement and effective capacity management tool and partly because broadband providers need to find a way to meet their bold promises to customers about maximum available capacities.

Finally, costing can help to manage broadband network usage. Prohibitive costs discourage use or prevent availability in certain areas. It is debatable whether this is fair or not but in the short term it avoids a free for all that exceeds capacity and in the long term it encourages investment.

Conclusions

The internet certainly is a wondrous resource, although this is only the case if it works. Surfers will marvel at crystal clear video streaming but only if it loads quickly and doesn't stutter. If it does they will just click away.

Broadband infrastructure is currently being upgraded worldwide with the correct bespoke materials. This should ensure that future capacity will be better equipped to keep pace with demand.

Meanwhile, online businesses who want to use video and other high demand content should upgrade to a dedicated server and implement a variable capacity schedule. They offer peace of mind hosting while ensuring the visitor experiences fast content uploading at all times.

For more information, please contact EBS on **0121 384 2513**,
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