Transparency – traffic management and speeds

No blocking/slowing down/degrading/discrimination against specific websites/classes of traffic

Preferential treatment permitted, so long as it does not impair in a recurring or continuous manner the general quality of internet traffic.

Traffic management only permitted to prevent serious crime/security but traffic management limited to temporary or exceptional congestion provided equivalent traffic is treated equally.

Consumer Harm
Consumer Harm

- No voluntary blocking of child abuse material on IWF block list
- No parental controls, which block over 18 content
- No spam blocking, even with consent of the end user
Quality of service reduced
Traffic management?

It is how the Network would deal with customer data flows to make it more efficient and increase the effective capacity of the Network to improve the end to end user experience.

It provides the control needed to maintain user experience and quality even if:
- Different application race for network resources independently and randomly
- Network conditions change due to customer mobility and concentration of traffic
The science of radio dictates that capacity and user performance decreases the further users are from the radio site

- The capacity and user performance delivered by a radio site varies by user location
- If users are at cell edge e.g. deep indoors, the radio signal struggles to reach them lowering the network capacity
- A HD Video has a typical data rate of 2.5Mbps: if 2 users at the cell edge both try and view an HD video, both users are likely to experience video stalling
- To add the same capacity for serving video as the content optimisation, would require more than double the site density
Types of Traffic management

- Optimization
  - It targets the best user experience that sustains over changing mobile environment due to mobility or congestion

- QoS & Prioritization
  - The goal of QoS is to provide guarantees on the ability of a network to deliver predictable results dependent on service & traffic type

- Caching
  - Storing the frequently used content by customers in a specific area, city or country as close as possible to accelerate content delivery

- Congestion management
  - Control of traffic delivery and policies to ensure that the congestion impact is minimized and sensitive traffic is not impacted

- Spam Filters
  - Intelligent analysis of email patterns and identification of spam senders
Optimization
it is primarily about providing the best possible video experience

http://www.youtube.com/watch?v=C-U_DOG06G8&feature=share&list=PLI9V6UQ7-7H0f7W9rf3xeOLMG8j9WTztP
http://www.youtube.com/watch?v=IGR7lW-oSbE&feature=share&list=PLI9V6UQ7-7H0f7W9rf3xeOLMG8j9WTztP&index=1
QoS & prioritization

- Every application has different needs dependent on its nature.
- Some applications can tolerate delays (e.g. emails, chat,..)
- Some applications require much more bandwidth than others (e.g. Video)

<table>
<thead>
<tr>
<th>QCI</th>
<th>Bearer Type</th>
<th>Priority</th>
<th>Packet Delay</th>
<th>Packet Loss</th>
<th>Example</th>
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<tbody>
<tr>
<td>1</td>
<td>GBR</td>
<td>2</td>
<td>100 ms</td>
<td>$10^{-2}$</td>
<td>VoIP call</td>
</tr>
<tr>
<td>2</td>
<td>GBR</td>
<td>4</td>
<td>150 ms</td>
<td>$10^{-5}$</td>
<td>Video call</td>
</tr>
<tr>
<td>3</td>
<td>GBR</td>
<td>3</td>
<td>50 ms</td>
<td></td>
<td>Online Gaming (Real Time)</td>
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<tr>
<td>4</td>
<td>GBR</td>
<td>5</td>
<td>300 ms</td>
<td></td>
<td>Video streaming</td>
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<tr>
<td>5</td>
<td></td>
<td>1</td>
<td>100 ms</td>
<td>$10^{-3}$</td>
<td>IMS Signaling</td>
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<tr>
<td>6</td>
<td>Non-GBR</td>
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<td>300 ms</td>
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<td>Video, TCP based services e.g. email, chat, ftp etc</td>
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<tr>
<td>7</td>
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<td>Voice, Video, Interactive gaming</td>
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<tr>
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<td>Video, TCP based services e.g. email, chat, ftp etc</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>9</td>
<td>300 ms</td>
<td>$10^{-3}$</td>
<td></td>
</tr>
</tbody>
</table>

LTE traffic classification as defined by 3GPP standards
End User **Experience** is Content dependent

- Standards and consequently Networks evolved from a 'dedicated resources' to 'shared pool of resources', where the resources pools are managed on the basis of QoS requirements for different services.
- Standards define different QoS per services based on service characteristics.
- Without the possibility to allocate and manage shared resources across the network intelligently, there will be QoE degradation.
- This is valid especially for real-time services which rely by nature on higher QoS, thus also limiting Innovation.

Net Neutrality will degrade the quality of majority of internet services overtime.

Potential degradation for 75% of the main services in busy hours.
Caching

Internet content is spread around the world and getting it closer reduces latency and improves user experience, but is only applicable for some types of traffic that are non-encrypted and non-real-time content (e.g., Live TV)
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Internet content is spread around the world and getting it closer reduces latency and improves user experience, but is only applicable for some types of traffic that are non encrypted and non real time content (e.g. Live TV)
Spam filters are bi-directional (preventing incoming and outgoing spam)

- Spam distorts users and can block networks due to loads of illegitimate traffic
- Example: an employee on vacation can find out that his mailbox is full and loses important emails because he received 100s of spam that consumed his/her inbox capacity
- An ISP (Internet Service Provider) can suffer latency or even reach a Denial of service as it receives millions of spam emails blocking its capacity for legitimate use

Examples of anti-spam techniques:
- Known Spammers list
- Inspecting embedded URLs
- Falsified address of the sender
- On the fly content checks

In IE (@Vodafone.ie) we measured <10% of outgoing email being spam
In IE (@Vodafone.ie) we measured ~95% of incoming email being spam
Specialised services
IP technology relies on pooling resources for high efficiency, that's why the entire world is moving to IP

- Providing **logically distinct capacity with strict admission control** based on type of application is a very challenging and inefficient use of network resources.
- Currently the standards does not facilitate this type of separation, this actually goes against 3GPP and GSMA standards
- Instead all standards differentiate between services based on the minimum requirements of these services (e.g. Voice requires special treatment to maintain its quality under all conditions) while keeping all resources pooled for efficiency
Examples

- Voice?
- mHealth – time critical M2M services
- Enterprise services
The proposals will distort competition
Congestion Management in the future

- With the proliferation of devices and wider LTE rollout, traffic will increase significantly and has to be managed in the best possible way.

If Network operators do **not** manage traffic, every application and content provider will try to absorb as much resources as possible from the network at both ends. This will be a completely non controlled environment, and even more prone to congestion.

Best Traffic Management requires full control of all traffic to take the right decision based on criticality of the content (e.g. emergency) and its nature (e.g. Voice).
The proposals will disadvantage European companies
US position
- Transparency
- No blocking/discrimination
- Preferential treatment permitted provided not discriminatory
- Reasonable traffic management permitted
- Spam filters/parental controls/blocking illegal content permitted

EU Commission
- Transparency
- No blocking/discrimination
- Preferential treatment permitted provided no material impact on internet speeds
- Traffic management limited to congestion
- Spam filters/blocking illegal content permitted but no parental controls

EU Parliament
- Transparency
- No blocking/discrimination
- Preferential treatment permitted provided on separate capacity + no discrimination
- Traffic management limited to congestion
- No spam filters/no parental controls/blocking illegal content permitted