



The Future of Video Delivery

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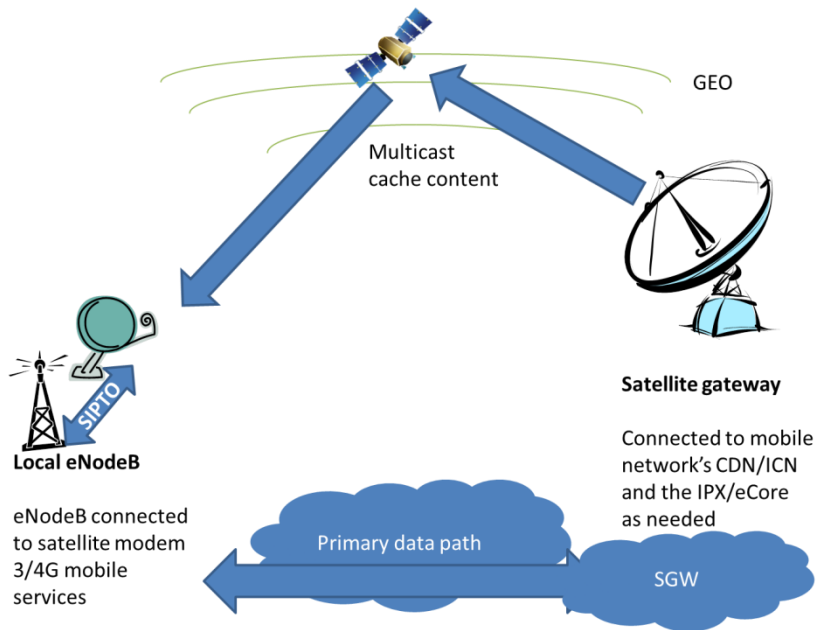
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Future of Video Delivery Background

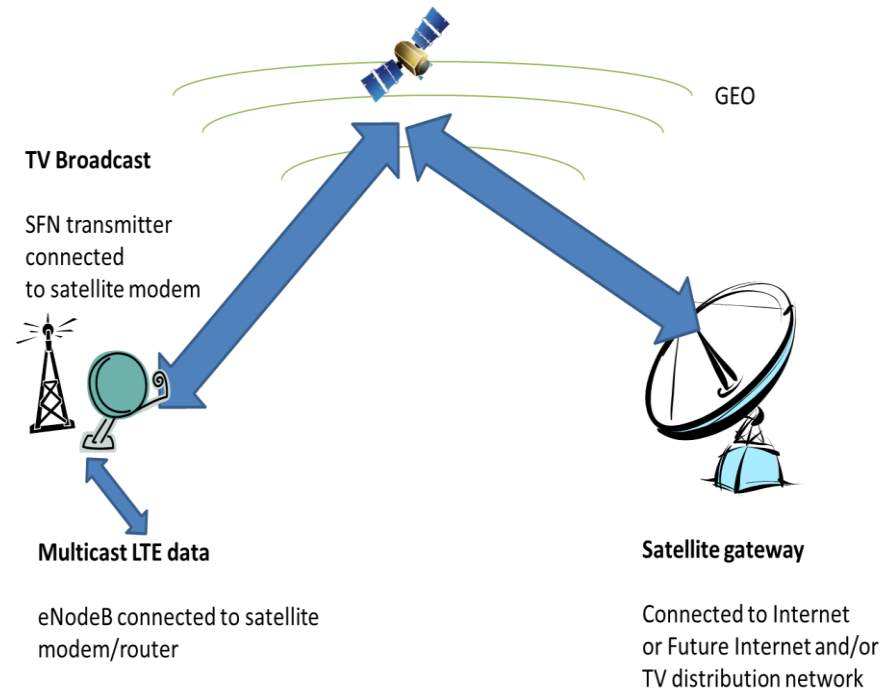
- Historically:
 - Video delivery towards end-users has been implemented over specific broadcast networks, mainly DVB (via satellite, cable, or terrestrial distribution).
 - Dominated by broadcasters.
- Today:
 - Trend towards on-demand consumption, where a video may have been stored on a local cache before (video recorder), or is transmitted over the Internet (e.g. from services like YouTube, or from broadcaster's own media servers).
 - Strong interest for local content is more and more met by local production. Distribution of such individual content is usually limited to channels like YouTube, due to the restricted access to broadcast networks.
 - Video consumption across a variety of devices (fixed and mobile) with different screen sizes, formats and screen resolutions – implying different data rates need to be accommodated including up to UHDTV.
 - Huge live events such as the Olympics, etc. are a major argument for a broadcast-capable architecture.
 - Pressure on terrestrial broadcast spectrum.

Example Scenarios

- At 4G cell sites (eNodeB) using the 3GPP SIPTO specification
- At network core edge
- (ESA ARTES 1 - Integrated Services Delivery study)



- Feeding LTE multicast / broadcast (another variation on SIPTO)
- Low power high density TV using SFN



Possible Areas for Research that could be integrated into a larger project

- Efficient methods for future video distribution for both fixed and mobile users.
 - Large broadcast cell is the inefficient medium for individual (on-demand) content distribution,
 - End-to-end internet transmissions are the suboptimal approach to serve millions of users with the same content – even when the content is consumed in a time-shifted manner.
- Increase spectrum efficiency, bandwidth and individualisation of content distribution. Moving from large DVB-T cells to very small cells (SFN). How to organise and reconfigure a huge network of SFN transmitters (in different channels) depending on demand and user distribution and time.
- Re / evaluate the benefits that might come from hierarchical video coding schemes. It might be useful to have low-quality content stored locally (at least for a large number of videos), and provide the possibility to upgrade the quality on-demand.
- Evaluate how wireless backhaul towards the DVB-T transmitters could complement content broadcasts via satellite.
 - A terrestrial backhaul could be used to provide additional quality layers. Rather than requesting the additional quality layers over individual user's lines, the request might come from the transmitter and be fed into the DVB-T stream.
 - This would also benefit the deployment of the small DVB-T cell for broadband Internet access in rural areas.



Avanti Company Profile

- Avanti is listed on the London Stock Exchange (AVN.L) with \$850 million invested in its fleet. Three satellites in orbit. One under construction.
- HQ based in London and significant operations in Cornwall, Cyprus and Germany.
- Avanti owns and operates spectrum and a fleet of satellites and Earth stations which deliver high speed data communications services in Europe, the Middle East and Africa.
- We utilise a new generation of satellites using “Ka-band” frequencies which deliver higher bandwidth and lower costs compared to previous generation satellites.
- The services are used in Enterprise Networks, Carrier Services, Security & Defence and Consumer Broadband.
- Avanti has particular interests in cellular backhaul and video distribution.
- Avanti has long experience of collaborative research projects and is leading of the FP7 ICT BATS project (Broadband Access by Integrated Terrestrial and Satellite Systems)
- Able to participate in H2020 bids from both UK and Cyprus