Content delivery from the edge; Indian Perspective

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Introduction

- India is a vast country with diverse cultures, languages and regions. It has large Metros, Urban, suburban, towns, rural and remote areas. Internet Content is mostly English language. Content available India is vastly focused on Metro/ Urban areas.

- Internet is expected to grow from present 10 Million (Approx) Broadband connections to 100 Million in next 2/3 years.

- While such connections grow, Total download per connection is also expected to grow many fold, thanks to Video need

- Such growth would put enormous need for domestic and international carriage

- Content being available nearby would reduce transport needs as well as there would be focus to local needs and more relevant to the users

Present Situation

- Within the context of this presentation, India being a large country, 4 regions are suggested for Content flow. Edge is defined as traffic within the region.

- Presently , Content served is (Based on our Company data)
- Approx 70% , From out of India
- Approx 20% , Other regions of India
- Approx 10% , within region

- Latency is to be taken as measure of service within the region.

- For the expected growth of Internet content specially Video, large capacity is required for region to India International Gateway i.e. National Long Distance (NLD) and International Capacity

Internet

- Tariff dependent upon no of bytes/usage time

- Service delivery value chain consisting of
  Service provision
  - Access service provision
  - Network provision
  – Content; Creation
  – Aggregation
  – Applications; Development; Provision

Broadband Service; Content

India is

- A vast country with diverse cultures, languages and regions

- Large Metros, Urban, suburban, towns, rural and remote areas

- Content is English language and Western hemisphere centric

- Even content produced in India is vastly focussed on Metro/Urban areas

Broadband Content Requirements

Hence India has need for

- Local and regional content
- Content in local language text
- There is population with lack of education thus necessitating basic devices with simple controls
- **Along with text there should be audio/ video delivery**
- Content needs to be contextual hence generated within the region and remote areas
- Selective prioritization should be possible
- Scalability is very important as Content ecosystem needs to be low capacity keeping the cost in view
- Once accepted , there would be need to scale

Focus on QoS and QoE

■ It has been established that in remote parts of India ,there is primitive knowledge of Internet and devices are also likely to be basic keeping affordability in mind, there has to be focus on QoS and QoE

■ **QoS-Quality of Service**

  Collective effect of service performances which determine the degree of satisfaction of a user of the service

■ **QoE – Quality of experience**

  Quality of Experience (QoE) is a measure of the overall acceptability of an application or service, as perceived by the user

Broadband Service

Internet providing QoE Customer needs (Understanding and Provision)

Compilation of data, content creation with focus on local needs

Content

Computers networked to push content close to end user resulting in,

- Low latency (time it takes for requesting device to receive a response)

- Low Jitter (fluctuations in latency)

- Higher control on available bandwidth as less distance is to be covered

- Better reliability with cost advantage

Service to User

- User to be allowed unrestricted VoIP services and any other Internet audio. video and data applications

- Content as brought closer to the user has benefits technical and commercial. Content at the edge also becomes more relevant adding value to the users in vicinity. Thus, Internet has likelihood of better acceptability and would result in better growth. This growth would help in bridging digital divide.

- There should be focus on content availability closer to the user. Service may be distinguished on the basis of latency e.g.

   Class A ; end to end latency (2 way) less than 100 msec and

   Class B ; end to end latency (2 way) less than 400 msec

WITH FOCUS ON 100 msec LATENCY DELIVERY

Broadband Service Latency/Throughput

■ Example demonstrating benefit of lower latency

■ FILE SIZE ; MP3 song of 5 minutes duration; 10 MByte approx.
   1.5hour duration Video MPEG4, 2 Mbps ; 1100 MByte approx.
   1.5hour duration Video HD, 9Mbps   ; 5 GByte approx.

■ Latency effect on download (download speed ; TCP window/latency)
   - 400 msec ; best download 1 Mb (125 KByte/s),
1100 MB file time to download ;145 minutes app.
5000 MB file time to download ;660 minutes(11 hours) app.

■   - 40 msec : best download 10 Mb (1.25 MByte/s),
1100 MB file ,time to download ;14.5 minutes app.
5000 MB file, time to download ; 66 minutes app.

Content to the edge

- The Focus here has been to draw attention to all Internet Ecosystem managers that Content needs to be brought closer for Internet to be more relevant to large part of the society

Just an aside

- Content must be reachable to newer Internet customers. There is likely challenge of IPv4 address availability. Hence all Content needs to be enabled to connect customers via both IPv4 and IPv6

THANK YOU!