



D4.1.1 - Recommendations for Aggregation Schemes & Implementation

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Ministry of
Communications and Works



Regione Toscana



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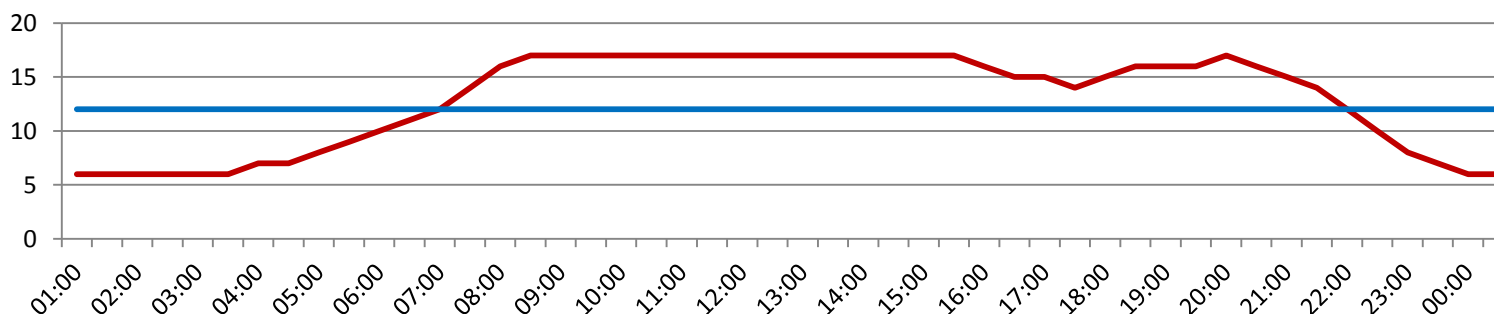
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Background

- Cost = Supplied Bandwidth
- Amount of Supplied Bandwidth is a function of:
 - Requested Peak Bandwidth
 - Allowed Contention
- Requested Peak Bandwidth depends on:
 - Offered maximum speeds (affects peak but not really long term)
 - Number of concurrent users
- Allowed contention depends on:
 - How much speed reduction users will put up with (expectations)





Concurrent Users

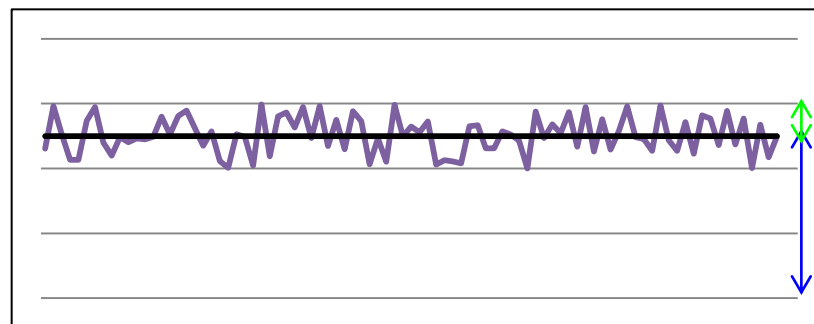
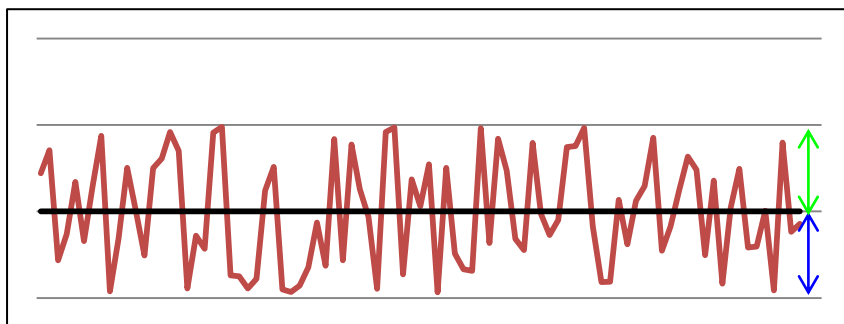
- This is a function of:
 - Number of users in a bandwidth pool
 - Amount and type of user activity
 - IBG was full transponder and targeted SMEs (shorter activity period)
 - Actually ended with Internet Cafes and File Sharing - challenging
 - Spread in time of activity
- Number of users in a pool is a function of:
 - How many customers overall
 - How total bandwidth pool is sub-divided
- Type of user activity
 - Mix of services available
 - Targeting of different user types with different traffic profiles
 - Consumers
 - Business
 - Enterprise
 - Schools

Name	Volume usage
HOME	100%
PRO	75%
ElitePlus	65%
ElitePremium	55%
Ultra	45%



Large Bandwidth Pool

- Larger pool smooths the Required Bandwidth over time (economy of scale)
 - Extreme low example (where pool is divided)
 - $1 * 10$ Mbps user in 10 Mbps pool – full speed
 - $1+1 * 10$ Mbps users in 10 Mbps pool – speed reduces by 50%
 - Extreme high example (where pool is shared)
 - $100 * 10$ Mbps user in 1 Gbps pool – full speed
 - $100+1 * 10$ Mbps users in 1 Gbps pool – speed reduces by 1%





Time of activity

- All networks have peak times
- Hughes have faced this challenge in IBG (Europe) and North America
- If load can be increased outside peak times
 - Improves customer experience
 - Allows bandwidth hungry applications to be used (scheduled)
 - Uses expensive bandwidth
 - Reduces peak required bandwidth



Spreading the Load

- Many ways to encourage non peak usage
 - Monthly limit – count off peak at reduced rate
 - Monthly Trust Threshold – don't count off peak
 - Fair Access policy – FAP free periods
 - Inform users of peak time and describe benefits off off-peak
 - Mixed users – Business + Consumer
 - Business daytime
 - Consumers evening
 - Additional benefit of different usage types
 - Geographic spread – time zones
 - Limited as just Europe
 - Off peak only Service Plans
 - Cheaper
 - No FAP
 - Etc.



HughesNet[®] in the US

- FAP
 - Not counted at some off-peak times
 - Called Bonus Allowance
 - Can be assigned a max value for month
- Tools
 - Use of Download manager to allow scheduling of large downloads
 - Use of Packet Shaper to reduce abusive use and flatten bandwidth usage