GFR : GFR TRAFFIC CONTRACT

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GFR allows the user to reserve a certain amount of capacity , in terms of cell rate for each **GFR VC**. This assures the user application that it may transmit at a minimum rate without losses . If the network is not congested the user will be able to transmit at a higher rate .There is no gurantee of Frame delivery .All the cells in a frame must have the same **CLP** setting .

The **GFR** *Traffic Contract* consists of the following parameters.

Peak Cell Rate (**PCR**)
Minimum Cell Rate (**MCR**)
Maximum Burst Size (**MBS**)
Maximum frame Size (**MFS**)
Cell delay variation tolerance (**CDVT**)

Supporting Rate Guarantees
Three basic approaches exist , that the network uses to proide per-**VC** gurantees to the users .They are as follows :

Tagging and Policing
CLP(Cell Loss Prioriry) = 1 is set for all the cells in those frames which do not conform to the **GFR** traffic contract.Thus this is the *tagging* of the non-conforming cells .The tagged cells are given lower **QOS** as compared to the untagged cells during scheduling , buffer management etc.*Policing* functions include discard of tagged (non-conforming) cells by the network .

Buffer Management
When a congestion condition is indicated by high buffer occupancy the tagged cells can be dropped in favour of the untagged cells . Buffer can be cleared

for incoming untagged cells by discarding tagged cells.Per-**VC** buffering an be done and the cell discard decision can be taken based on the individual traffic contracts of each VC .

Scheduling
Scheduling cn be done in a way to give a higher priority to the untagged cells.As in Buffer management , per-**VC** scheduling can be done .This helps in controlling the outgoing rate of each VC thus leading towards fair allocation in order to meet the contract bindings for each **VC**.

GFR Cell Conformation Criteria

A Frame is conforming if each of it's cells are conforming and non-conforming if even one of them is non-conforming .Following are the conformation criteria for cells :
1. The rate of cells must be within the cell contracts .
2. All Cells of a frame must have the same CLP value .
3. The frame containing the cell must conform to the Maximum Frame Size ctiterion .

QOS Eligibility Test

The frames to be tranmitted on a **GFR-VC** fall into three categories .
Nonconforming frames
Cells of these frame are either discarded or tagged(**CLP**=1.
Conforming but ineligible frames
These cells are not eligible for **QOS** guarantees under the traffic contract of the given **VC**.These receive a best effort service .
Conforming and eligible frames
These are receive the guarantee of delivery .

INTRODUCTION TO CELLULAR WIRELESS NETWORK

Network Organisation
In stead of high power transmitters a number of low power transmitters is used (of the order 100 W or less).Because of the small range the area to be served can be divide into small cells each having it's own **base station** and it'sown band of frequencies. Adjacent cells are assigned different frequencies but sufficiently distant cells can have the same band of frequency .

shape of cells
A mtrix of square would be the simplest in terms of the design but here the sentres of all adjacent cells are not equidistant which desirable .It makes switching(between base stations) decisions easier . A hexagonal design is ideal as far as these condierations go .

Frequency Reuse

The power of the transmitters in the wireless systems is limited so that signals with significant strength are confined within the corresponding cell .These will allow the sharing of same frequency band in other nearby(not adjacent) cells. Thus it is essential to determine how many cells must intervene between two sharing the same frequency band. This is termed as frequency reuse. The commonly used prameters in characterising frequency reuse are:

$\boldsymbol{D}$ = minimum distance between centres of cells having same frequency bad
$\boldsymbol{R}$ = radius of a cell
$\boldsymbol{d}$ = distance between centres of adjacent cells
For hexagonal $\boldsymbol{d}$ is $\sqrt{3R}$.
$N = reusefactororthenumberofinterveningcells.$

$Inthehexagonalpattern\boldsymbol{N}cantakefollowingvalues$
$\boldsymbol{N} = \boldsymbol{I} + \boldsymbol{J} + (\boldsymbol{I} \times \boldsymbol{J})$
$\boldsymbol{I}, \boldsymbol{J} = 0, 1, 2, 3.....$

$andthefollowingrelationholds$:

$\frac{\mathbf{D}}{\mathbf{R}} = \sqrt{\mathbf{3N}}.$