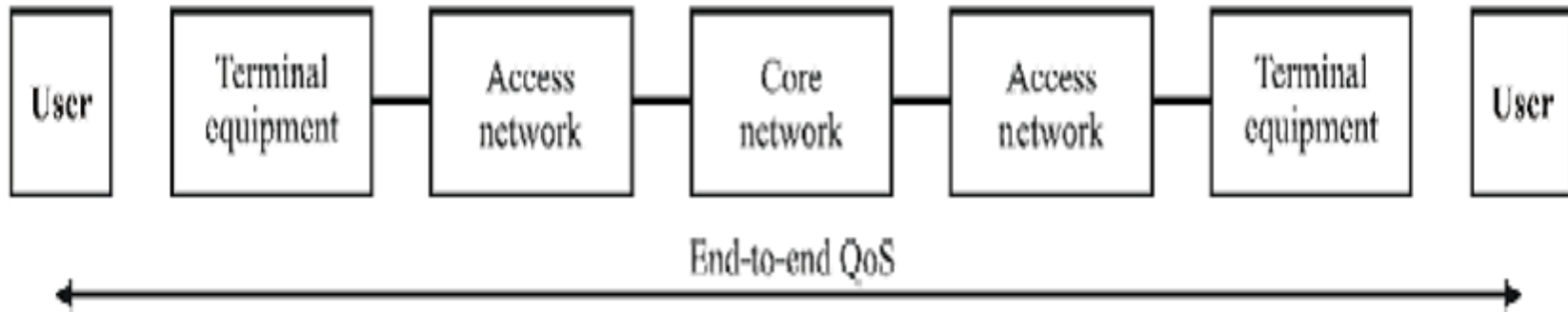
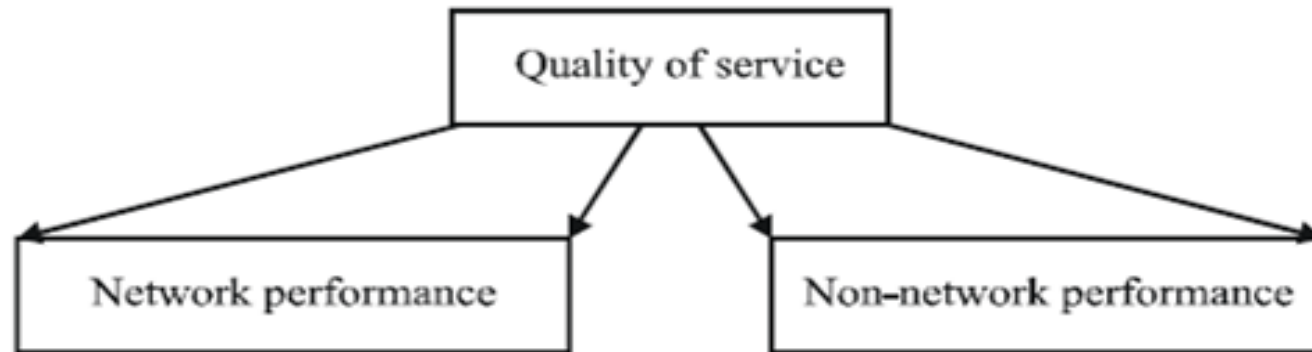


## Framework of QoS Monitoring and Implementation in India

- I. General guide to concepts of QoS:
  - (a) End to end QoS: The end to end QoS depends on the contribution made by the components as shown below:

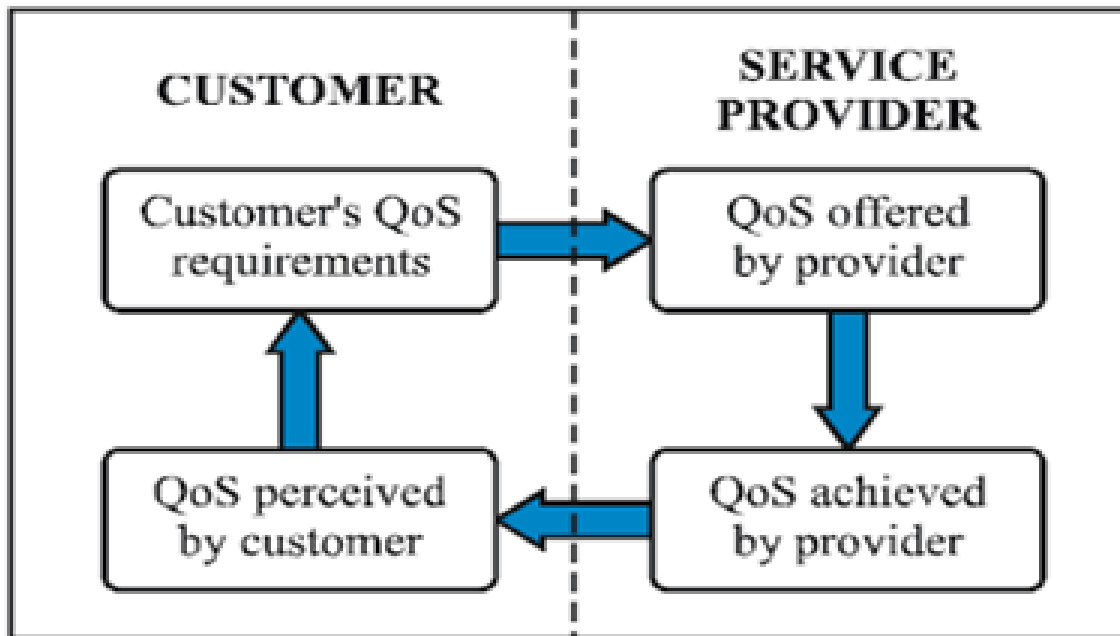


(b) QoS comprises both Network Performances and non-network related performance



Examples of Network Performance are bit error rate, latency etc. and for non-network performance provision time, repair time, range of tariffs, complaint resolution time etc. The list of QoS criteria for a particular service could vary among the segments of the customer population.

## C.: Four view points of QoS:



Four view points of QoS are:

- i) Requirement of QoS by the customers
- ii) QoS offered/planned by the Service providers
- iii) QoS delivered/achieved by the Services Providers
- iv) QoS experienced/perceived by the customers.

## D. Matrix for determination of QoS criteria:

		Service Quality Criteria						
		SPEED 1	ACCURACY 2	AVAILABILITY 3	RELIABILITY 4	SECURITY 5	SIMPLICITY 6	FLEXIBILITY 7
Service Function								
SERVICE MANAGEMENT	Sales & Pre-Contract Activities 1							
	Provision 2							
	Alteration 3							
	Service Support 4							
	Repair 5							
	Cessation 6							
CONNECTION QUALITY	Connection Establish 7							
	Information Transfer 8							
	Connection Release 9							
Billing 10								
Network/Service management by customer 11								

Quality criteria of a telecom service may be derived from a matrix shown above. This matrix may be used for any telecom services to determine the requisite QoS criteria.

After determining the quality criteria, parameters can be defined and performance objectives can be set.

## II. QoS parameters in India: (a) QoS for Basic Services

Serial Number	Name of Parameter	Benchmark	Averaged over a period
(i)	Fault incidences (No. of faults/100 subscribers /month)	≤ 5	One Quarter
(ii)	Fault repair by next working day	<p><b>For urban areas:</b> By next working day: ≥ 90% and within 3 days: 100%.</p> <p><b>For rural and hilly areas:</b> By next working day: ≥ 90% and within 5 days: 100%.</p> <p><b>Rent Rebate</b> Faults pending for &gt;3 days and ≤7 days: Rent rebate for 7 days. Faults pending for &gt;7 days and ≤15 days: Rent rebate for 15 days. Faults pending for &gt;15 days: rent rebate for one month.</p>	One Quarter
(iii)	Mean Time To Repair (MTTR)	≤ 8 Hrs	One Quarter
(iv)	(a) Call Completion Rate within a local network shall be better than	≥ 55%	One Quarter
	or, (b) Answer to Seizure Ratio (ASR)	≥ 75 %	One Quarter
(v)	Point of Interconnection (POI) Congestion (on individual POI)	≤ 0.5%	One month
(vi)	Metering and billing credibility – post paid	Not more than 0.1% of bills issued should be disputed over a billing cycle	One Billing Cycle
(vii)	Metering and billing credibility – pre-paid	Not more than 1 complaint per 1000 customers, i.e., 0.1% complaints for metering,	One Quarter

		charging, credit, and validity	
(viii)	Resolution of billing/ charging complaints	100% within 4 weeks	One Quarter
(ix)	Period of applying credit/ waiver/ adjustment to customer's account from the date of resolution of complaints	within 1 week of resolution of complaint	One Quarter
(x)	Response Time to the customer for assistance		
	(a) Accessibility of call centre/ customer care	≥ 95%	One Quarter
	(b) Percentage of calls answered by the operators (voice to voice) within 60 seconds	≥ 90%	One Quarter
(xi)	Termination/ closure of service	≤ 7 days	One Quarter
(xii)	Time taken for refund of deposits after closures	100% within 60 days.	One Quarter

Amendments in benchmarks:

- (i) Revised to 7. (ii) for urban areas revised to 85% with in 5 days and for rural areas to 75% with in 7 days. (iii) MTTR revised to 10 Hrs. (viii) revised to 98% within 4 weeks and 100% within 6 weeks. (x-b) revised to 90 sec and 95%

## (b). QoS for Wireless Services

Serial Number	Name of Parameter	Benchmark	Averaged over a period
<b>A</b>	<b>Network Service Quality Parameters:</b>		
(i)	Network Availability		
	(a) BTSs Accumulated downtime (not available for service)	≤ 2%	One Month
	(b) Worst affected BTSs due to downtime	≤ 2%	One Month
(ii)	Connection Establishment (Accessibility)		
	(a) Call Set-up Success Rate (within licensee's own network)	≥ 95%	One Month
	(b) SDCCH/ Paging Channel Congestion	≤ 1%	One Month
	(c) TCH Congestion	≤ 2%	One Month
(iii)	Connection Maintenance (Retainability)		
	(a) Call Drop Rate	≤ 2%	One Month
	(b) Worst affected cells having more than 3% TCH drop (call drop) rate	≤ 5% upto 31.03.2011 ≤ 3% From 01.04.2011	One Month
	(c) connections with good voice quality	≥ 95%	One Month
(iv)	Point of Interconnection (POI) Congestion ( on individual POI)	≤ 0.5%	One Month
<b>B</b>	<b>Customer Service Quality Parameters:</b>		
(v)	Metering and billing credibility – post paid	Not more than 0.1% of bills issued should be disputed over a billing cycle	One Billing Cycle
(vi)	Metering and billing credibility – pre-paid	Not more than 1 complaint per 1000 customers i.e. 0.1% complaints for metering, charging, credit, and validity	One Quarter

(vii)	(a) Resolution of billing/ charging complaints	100% within 4 weeks	One Quarter
	(b) Period of applying credit/ waiver/ adjustment to customer's account from the date of resolution of complaints	within 1 week of resolution of complaint	One Quarter
(viii)	Response Time to the customer for assistance		
	(a) Accessibility of call centre/ customer care	≥ 95%	One Quarter
	(b) Percentage of calls answered by the operators (voice to voice) within 60 seconds	≥ 90%	One Quarter
(ix)	Termination/ closure of service	≤ 7 days	One Quarter
(x)	Time taken for refund of deposits after closures	100% within 60 days	One Quarter

Some parameters are amended as below:  
 (vii) Revised to 98% within 4 weeks and 100% within 6 weeks.  
 (viii-b) Revised to 90 seconds and 95%

## (c) QoS for Broadband Services

The service providers shall meet the benchmarks for the Quality of Service parameters for Broadband as laid down below:-

<b>Sl</b>	<b>QoS Parameters</b>	<b>Benchmarks</b>	<b>Averaged over a period of</b>
i.	<b>Service Provisioning /Activation Time</b>	100% cases in =<15 working days (subject to technical feasibility). In all cases where payment towards installation charge & security deposit is taken and the Broadband connection is not provided within 15 working days, a credit at the rate of Rs.10/ per day, subject to a maximum of installation charge or equivalent usage allowance shall be given to the customer, at the time of issue of first bill.	

ii.	<b>Fault Repair / Restoration Time</b>	By next working day: > 90% and within 3 working days: 99%  Rebate: (a) Faults Pending for > 3 working days and < 7 working days: rebate equivalent to 7 days of minimum monthly charge or equivalent usage allowance  (b) Faults Pending for > 7 working days and < 15 working days: rebate equivalent to 15 days of minimum monthly charge or equivalent usage allowance  (c) Faults Pending for > 15 working days: rebate equivalent to one month of minimum monthly charge or equivalent usage allowance	One month
iii.	<b>Billing Performance</b> • Billing complaints per 100 bills issued • %age of Billing Complaints resolved • Time taken for refund of deposits after closure:	< 2%  100% within 4 weeks  100% within 60 days	One month
iv.	<b>Response time to the customer for assistance</b>	% age of calls answered by operator (Voice to Voice)  Within 60 seconds > 60% Within 90 seconds > 80%	One month
v.	<b>Bandwidth Utilization/ Throughput:</b>  <b>a) Bandwidth Utilization</b> i) POP to ISP Gateway Node [Intra-network] Link(s) ii) ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity	<80% link(s)/route bandwidth utilization during peak hours (TCBH). If on any link(s)/route bandwidth utilization exceeds 90%, then network is considered to have congestion. For this additional provisioning of Bandwidth on immediate basis, but not later than one month, is mandated.	One month

	<b>b) Broadband Connection Speed (download)</b>	Subscribed Broadband Connection Speed to be met >80% from ISP Node to User.	
vi.	<b>Service Availability / Uptime (for all users)</b>	> 90% quarter ending June 2007; > 98% with effect from quarter ending September 2007 and onwards	One Quarter
vii.	<b>Packet Loss (for wired broadband access)</b>	<1%	One month
viii.	<b>Network Latency (for wired broadband access)</b>  • User reference point at POP / ISP Gateway Node to International Gateway (IGSP/NIXI)  • User reference point at ISP Gateway Node to International nearest NAP port abroad (Terrestrial)  • User reference point at ISP Gateway Node to International nearest NAP port abroad (Satellite)	<120 msec  <350 msec  <800 msec	One month
ix.	<b>Customer perception of Services</b>		One Quarter
(a)	% satisfied with the provision of service	>90%	
(b)	% satisfied with the billing performance	>90%	
(c)	% satisfied with help services	>90%	
(d)	% satisfied with network performance, reliability and availability	>85%	
(e)	% satisfied with maintainability	>85%	

(f)	% satisfied with Overall customer satisfaction	>85%	
(g)	% satisfied with Customer satisfaction with offered supplementary services such as allocation of static/fixd IP addresses, e-mail IDs etc.	>85%	



## (d) QoS for Wireless Data Services

<b>Serial Number</b>	<b>Name of Parameter</b>	<b>Benchmarks</b>	<b>Averaged over a period</b>
3.1	Service Activation /Provisioning	Within 4 hrs with 95% success rate.	One Month
3.2	Successful data transmission download attempts	>80%	One Month
3.3	Successful data transmission upload attempts	>75%	One Month
3.4	Minimum download speed	To be measured for each plan by the service provider and reported to TRAI	One Month
3.5	Average Throughput for Packet data	>75% of the subscribed speed.	One Month
3.6	Latency	Data <250ms	One Month
3.7	PDP Context Activation Success Rate	≥95%	One Month
3.8	Drop rate	≤5%	One Month

### III - Monitoring of QoS

- a) Every service provider is supposed to meet the prescribed QoS benchmarks for a particular service.
- b) There are some QoS parameters e.g. Provision of telephone after registration of demand, shifting of telephone connection and grade of service in case of basic telephone service which are to be monitored by the Service provider and no report is submitted to the TRAI. However, report on other parameters are to be submitted in prescribed formats on regular intervals to the TRAI.
- c) Similarly, service coverage of CMTS services is to be monitored by service provider and need not to be reported to TRAI. However, report on other parameters are to be submitted in prescribed formats on regular intervals to the TRAI.
- d) In case of broadband services and Wireless data services QoS parameters reports are submitted to TRAI in the prescribed format and at prescribed interval.

- (e) The performance of the Service providers for all services are subjected to periodic assessment by TRAI through Customer satisfaction surveys, which may be conducted by TRAI either through its own officers or through any agency appointed by it.
- (f) Every service provided is mandated to maintain documented process of collection of data for each QoS parameter. TRAI may specify uniform record keeping procedure and formats to be followed by the Service providers.
- g) TRAI may direct its officers or any appointed agency to inspect the record maintained by the Service providers and get such record audited.
- h) The authority may publish the compliance reports of QoS parameters provided by the Service providers. It may also publish the results of audit and objective assessment of QoS undertaken by TRAI and also the results of the customer satisfaction surveys.
- i) Every service provider is supposed to publish, for the information of the consumers, its performance with respect to QoS parameters as directed by TRAI from time to time.

## IV- Financial Disincentives

- a) If a service provider fails to meet QoS benchmarks of basic telephone services, TSP is liable to pay an amount not exceeding Rs. 50,000/- per parameter as financial disincentive.
- b) In case of broadband service provider, the financial disincentive is Rs. 50,000 /- for failure per parameter and it is increased to 1 lac per parameter in case of 2<sup>nd</sup> or subsequent contravention.
- c) In case of CMTS, the financial disincentives w.e.f. Oct, 2015 have been revised upwards . If CMTS provider fails to meet the benchmark of QoS parameters, it is liable to pay an amount not exceeding Rs. 1 lac per parameter for the 1<sup>st</sup> contravention in its quarterly report. If he fails to meet the benchmark of the same parameter in two or more subsequent quarters, amount is increased to Rs. 1.5 lacs. This amount is increased to Rs. 2 lacs for each consecutive contravention occurring thereafter.

(d) If the compliance report furnished by a service provider is false, TSP is liable to pay an amount, by way of financial disincentive, not exceeding Rs. 10 lacs per parameter for which such false report has been furnished.

(e) Failure to timely submission of QoS benchmark report shall attract a financial disincentive not exceeding Rs. 5,000 for every day during which the default continues.

## V- Consumer complaints redressal

- a) Telecom Consumer Complaint Redressal Regulation 2012 are improved version of TRAI's earlier Regulation of 2007.
- b) Every service provider will established a complaint service centre for redressal of complaint and for addressing service requests of its consumers. Complaint centre/call center shall provide the service in the local language of that service area in addition to Hindi/English.
- c) Every Service provider will also established a web based complaint monitoring system and the process for monitoring should be published in the leading newspaper once in six months in Hindi/English and local language and also through the telephone bills.
- d) Where a consumer is not satisfied with the redressal of his complaint by the complaint centre, such consumer may prefer an appeal to the appellate authority of the service provider. The appellate authority shall consist of one or more persons as may be decided by the service provider.

- (e) An advisory committee consisting of one member from a consumer organization registered with TRAI and other member of the service provider is to be established. This advisory committee shall render its advice for every appeal.
- (f) The appellate authority shall ensure uniformity in the procedure for deciding appeals. Due consideration to the advice given by the advisory committee will be given while deciding the appeal by the appellate authority.
- (g) Every service provider is to submit to the TRAI and also place on its website by the 15<sup>th</sup> of the month succeeding every quarter, a report mentioning the number of appeals received , disposed of and pending etc.

(h) Every service provider is suppose to maintain a telecom consumer charter containing the following information:

Name and Address of the service provider, services offered in different geographic areas, QoS parameters specified by TRAI , QoS promised by service provider, Equipments offered to the consumer, rights of the consumer, duties of the service provider, General information No., Customer Care No., Complaint redressal mechanism , Contact details of the Appellate authority and procedure for disconnection of each service offered by it etc.

(i) TRAI may direct its officers or an independent agencies appointed by it to inspect the complaint center and the secretariat of the appellate authority in order to ensure compliance of the provisions of this act.



## VI- QoS Implementation

- (a) The best way to achieve high level of QoS is through a healthy competition. Mobile number portability is one such regulation which gives choice to the consumers to retain the same number and switch over to another service provider as per his perception of QoS.
- (b) Implementation of QoS in India has undergone frequent changes due to consumer expectations of high quality services. The changes in QoS parameters benchmarks, additional QoS parameters, strict monitoring by service providers and TRAI, steep financial disincentives in case of contravention of QoS parameters etc. are some of the highlights in the area of QoS implementation in India.
- (c) with the lowest tariffs in India, the competition has shifted to the QoS. Service providers have to maintain high level of QoS to retain their high value consumers.
- (d) While measuring the QoS parameters, in case the particular parameter is not meeting the benchmark, the service provider may have to conduct drive tests and physical verification in order to optimize the network and achieve the benchmark.

- (e) Continuous efforts are required to analyze and correct the deficiencies in the network in specific sites in order to meet the benchmarks of QoS parameters.
- (f) When new QoS parameters are introduced (viz. notification of data limits consumed during and after communication), it may require new hardware/software changes in the network . It may involve additional costs to be paid to the vendors.
- (g) Monitoring and ensuring compliance to the QoS parameters as per TRAI benchmarks, maintaining all necessary records, submission of various reports and handling of complaints etc. is a huge implementation activity for every service provider.