

Managing and Testing QoS

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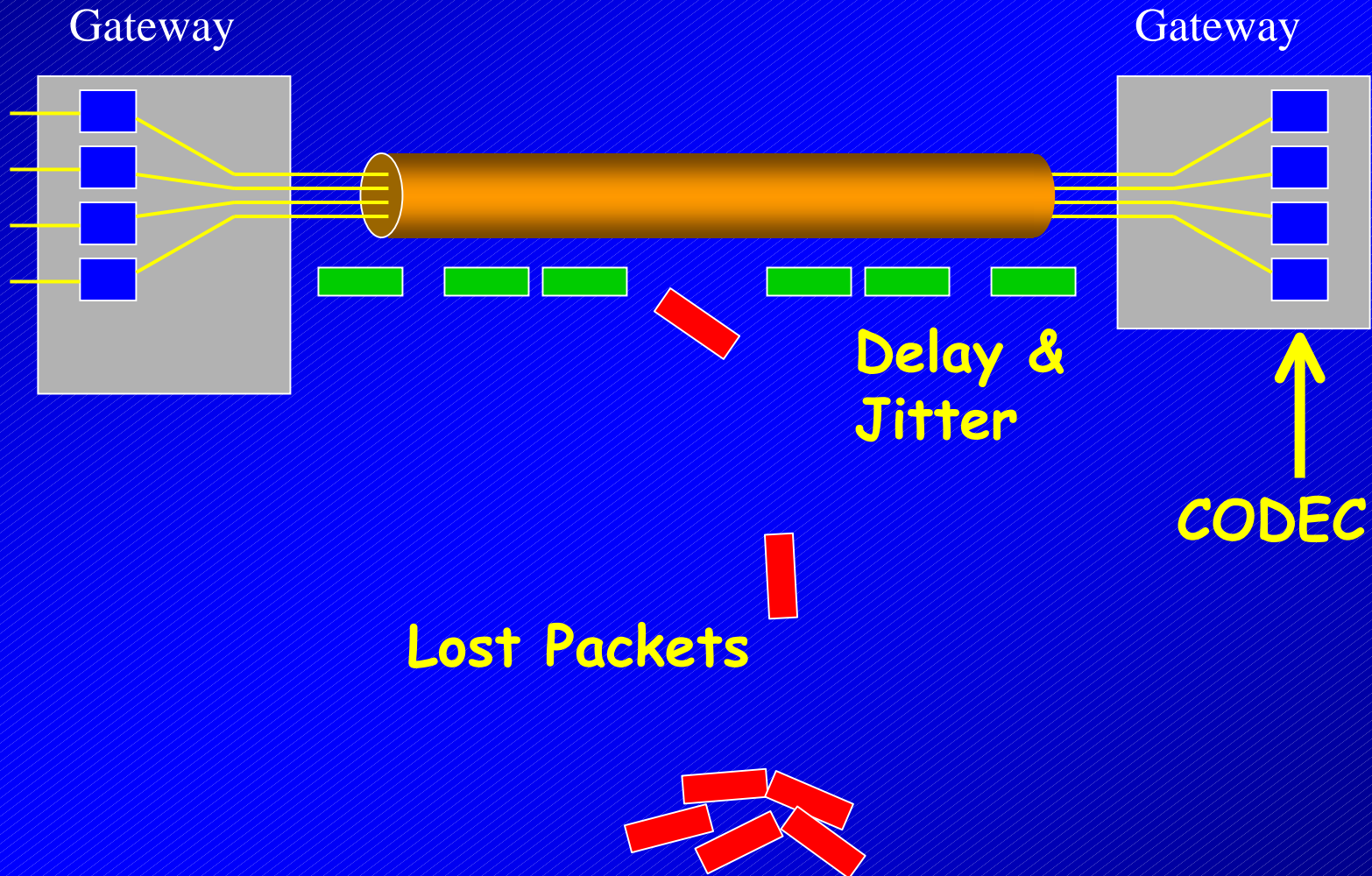
About Telchemy

- **Focus** - *deliver end-user perceived QoS with minimum use of network resources*
- **Approach** - *open architecture, software based, integrate with any VoIP systems*
- **First products** - *lightweight call quality monitoring software for integration into VoIP Gateways, IP Phones and SLA monitors*
- **Current development** - *QoS Server, providing Call Admission Control, Bandwidth Management*

Why Manage QoS?

- Maintain end-user perceived quality
 - *Subscriber retention/ satisfaction*
- Minimize network operating costs
 - *Avoid over provisioning*
- Enforce Service Level Agreements
- Support differentiated service levels
- Identify performance problems/
trends

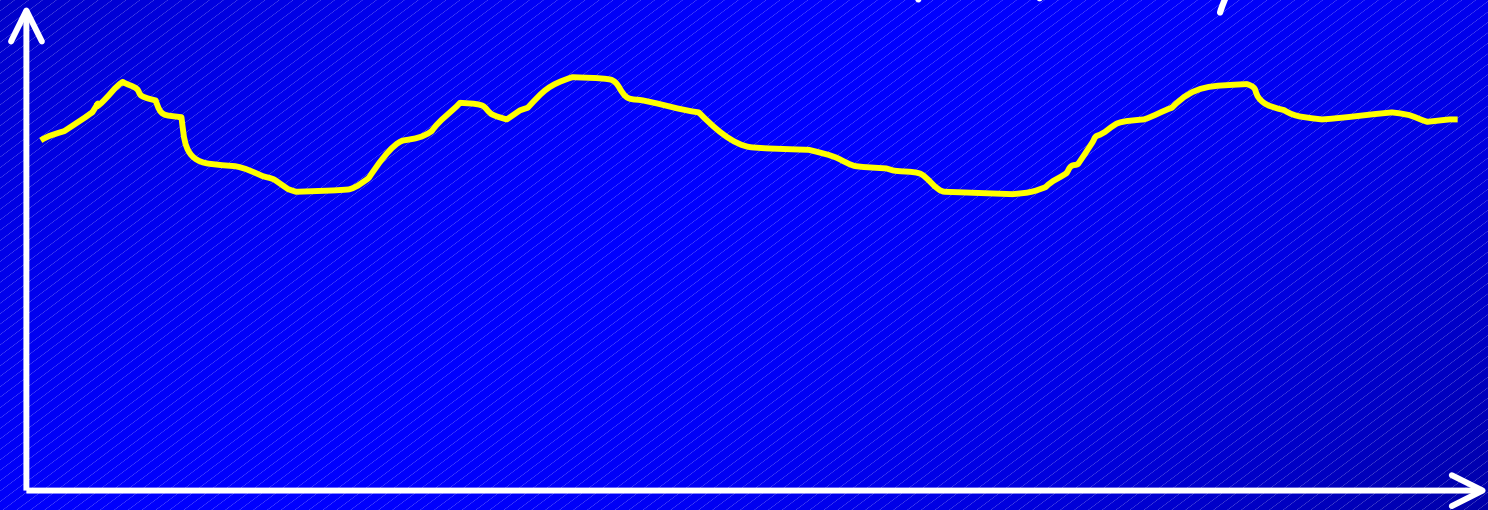
Factors impacting quality



Time Varying Impairments

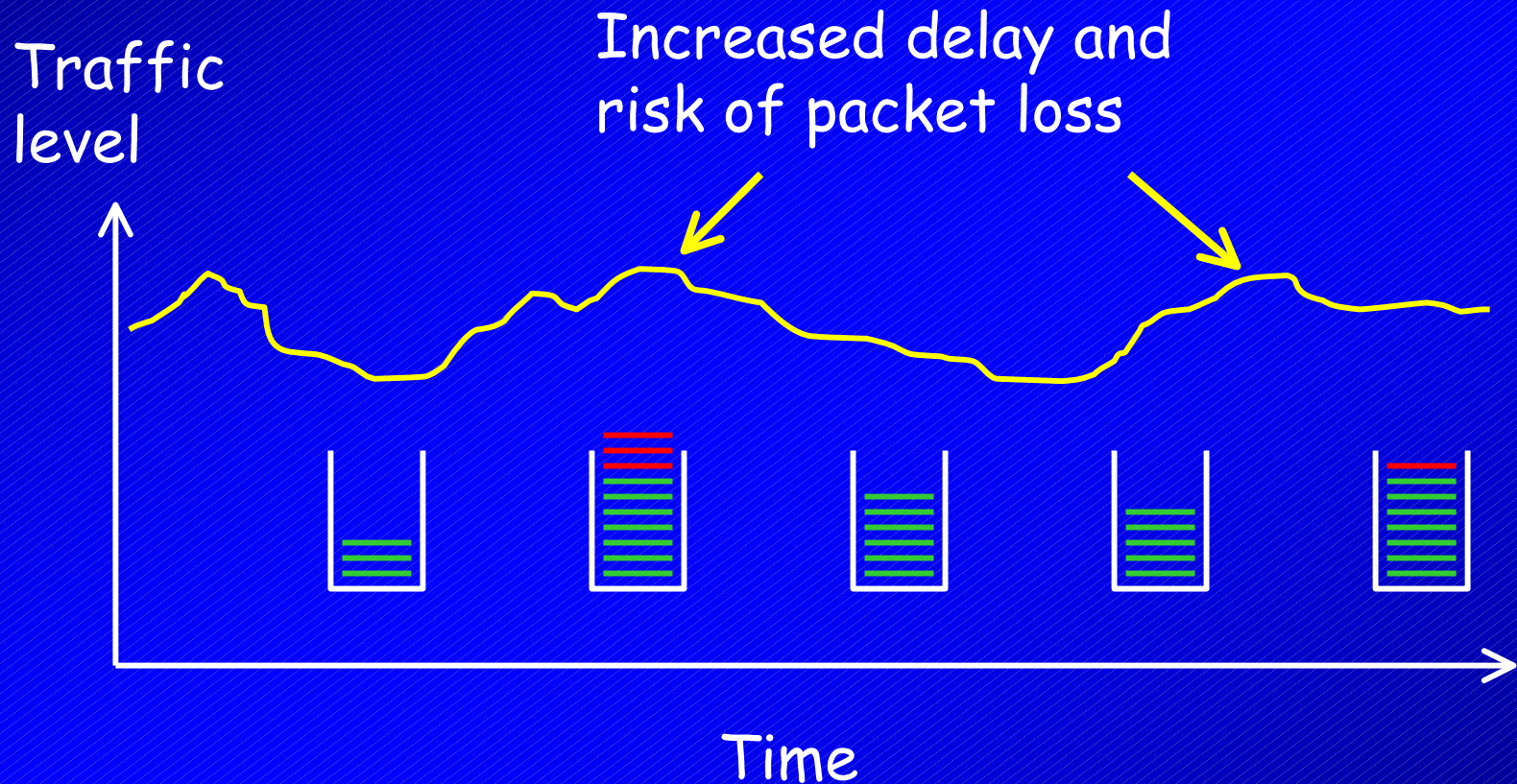
Traffic
level

Voice (and data) traffic
exhibits self-similarity

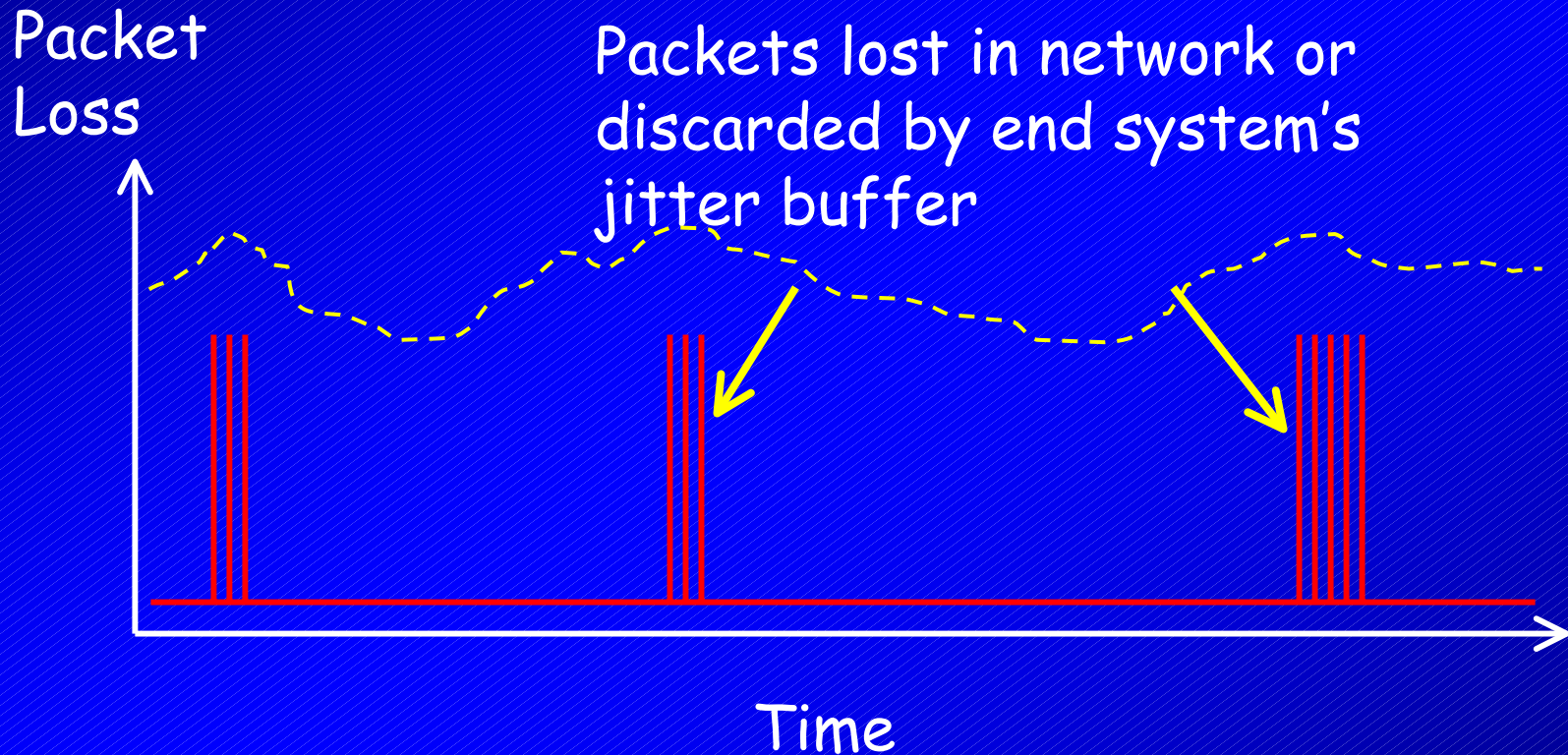


Time

Time Varying Impairments



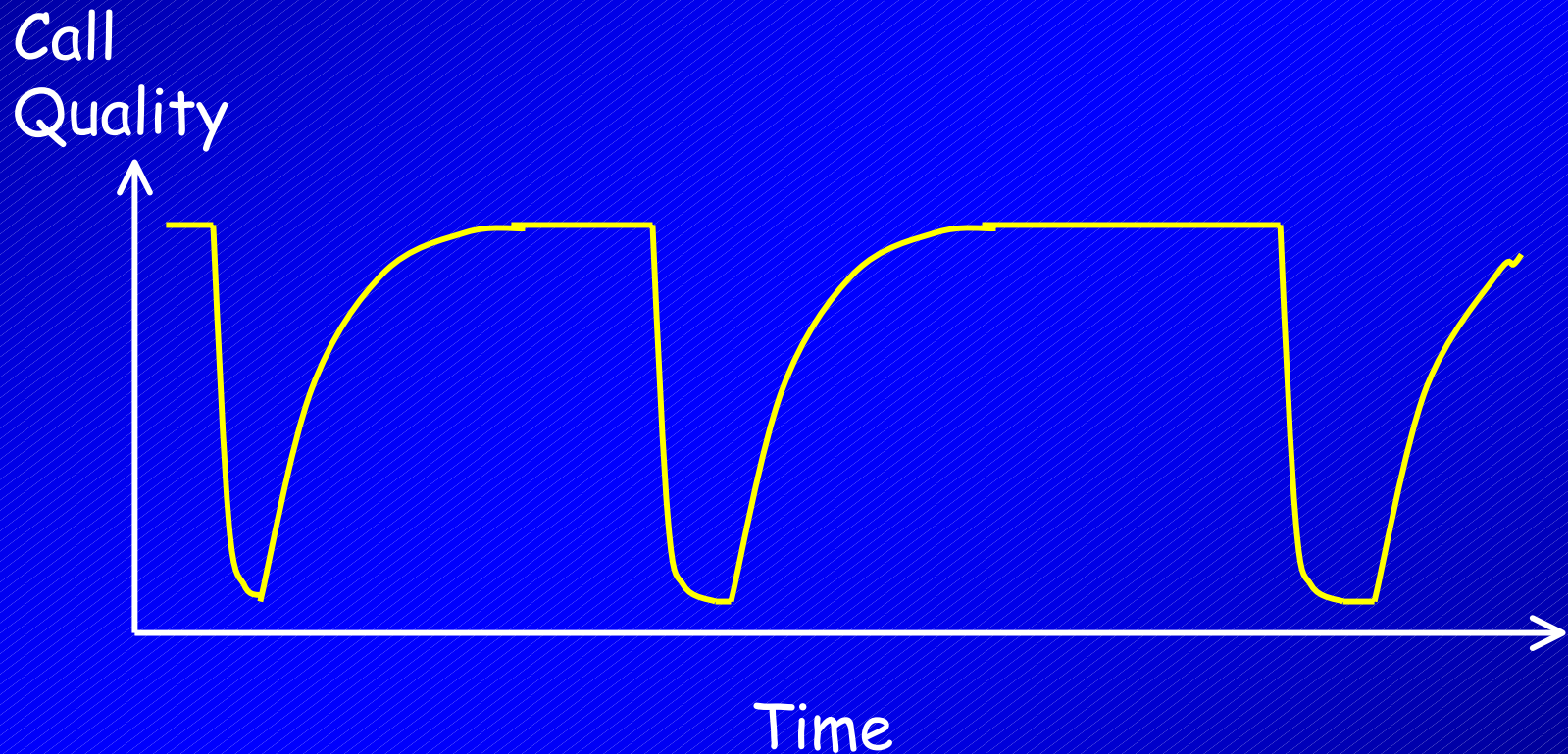
Time Varying Impairments



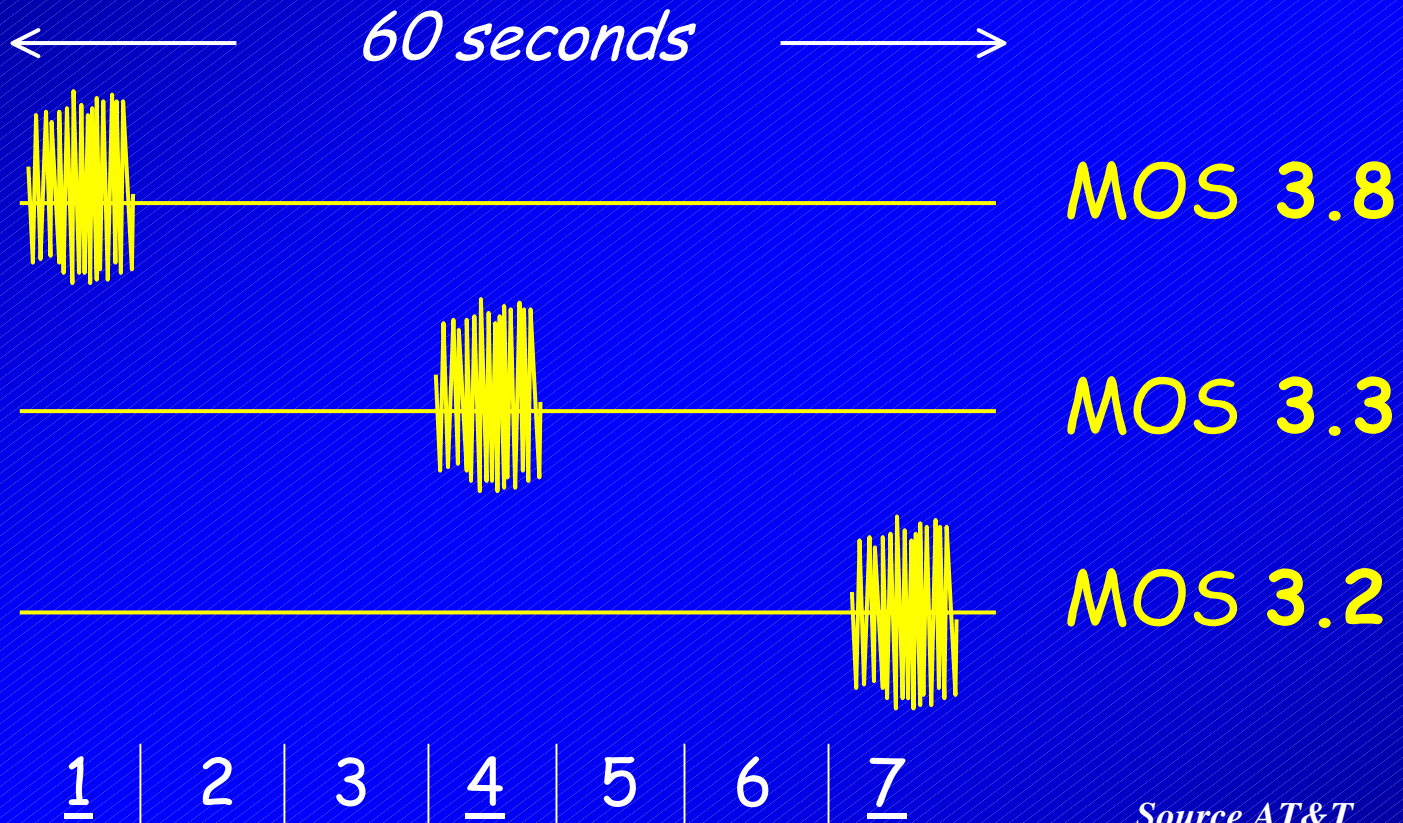
"Measured" Call Quality



"Reported" Call Quality

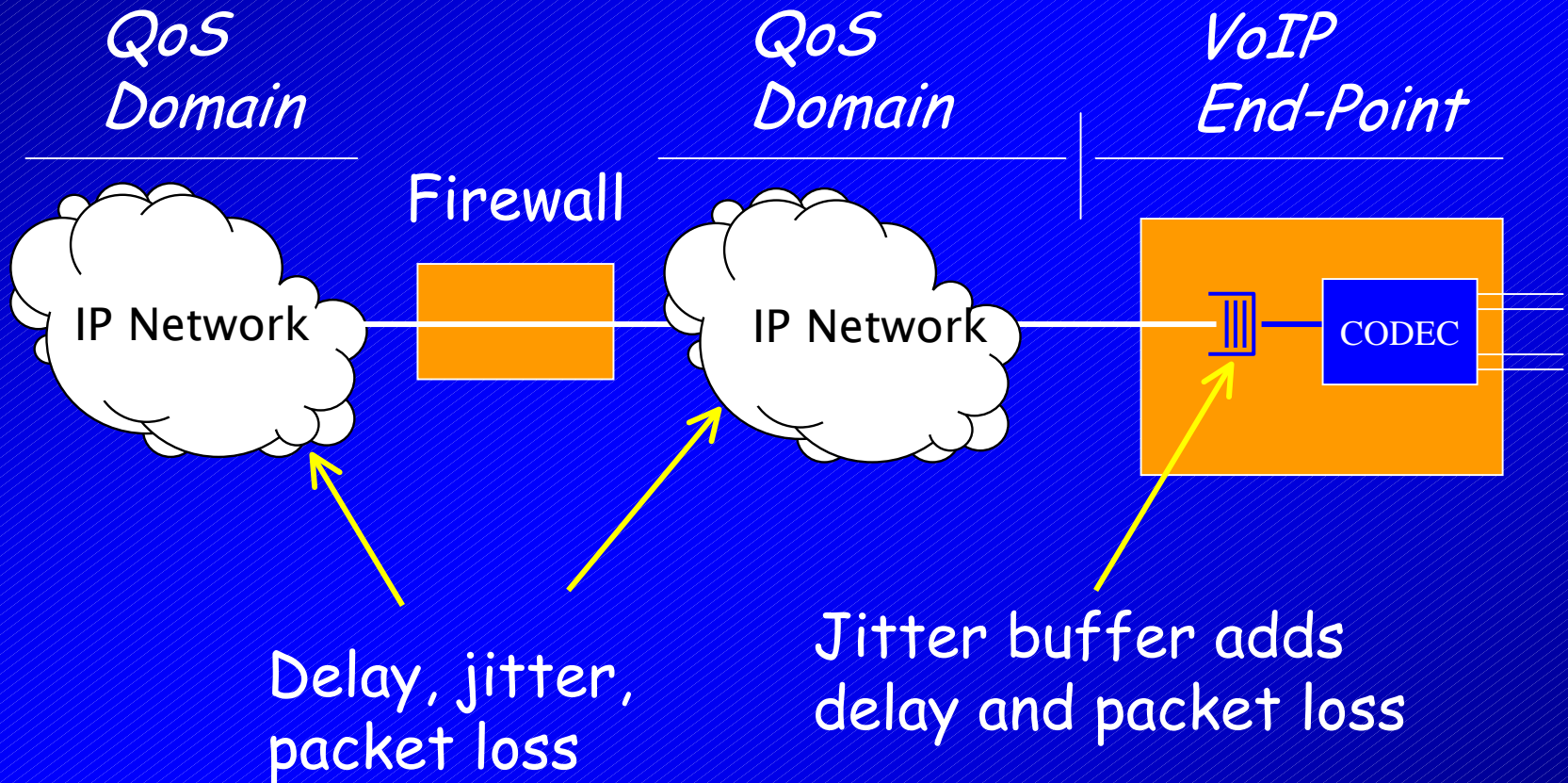


"Recency" effect

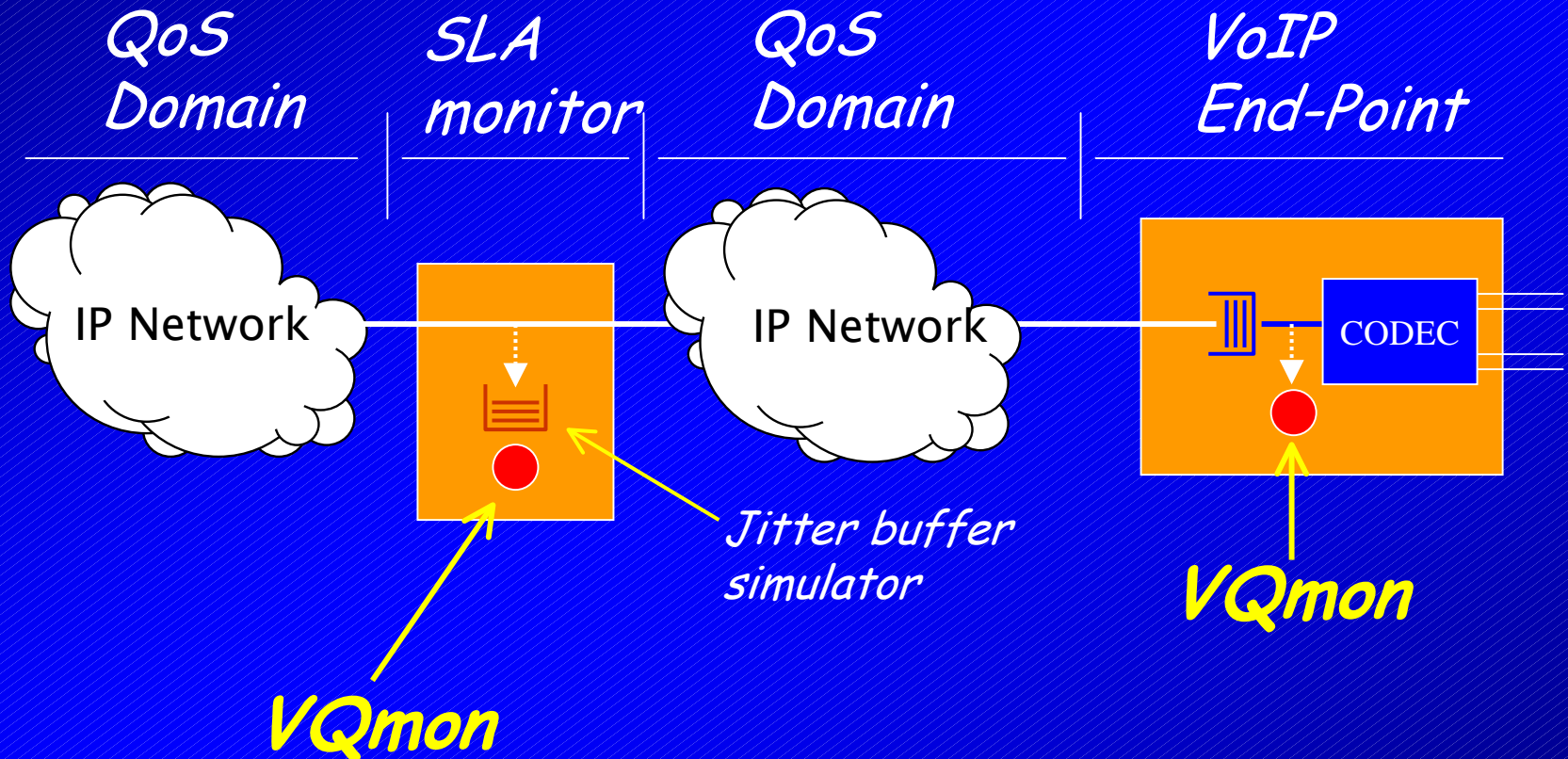


Source AT&T
TIA1.7/98-031

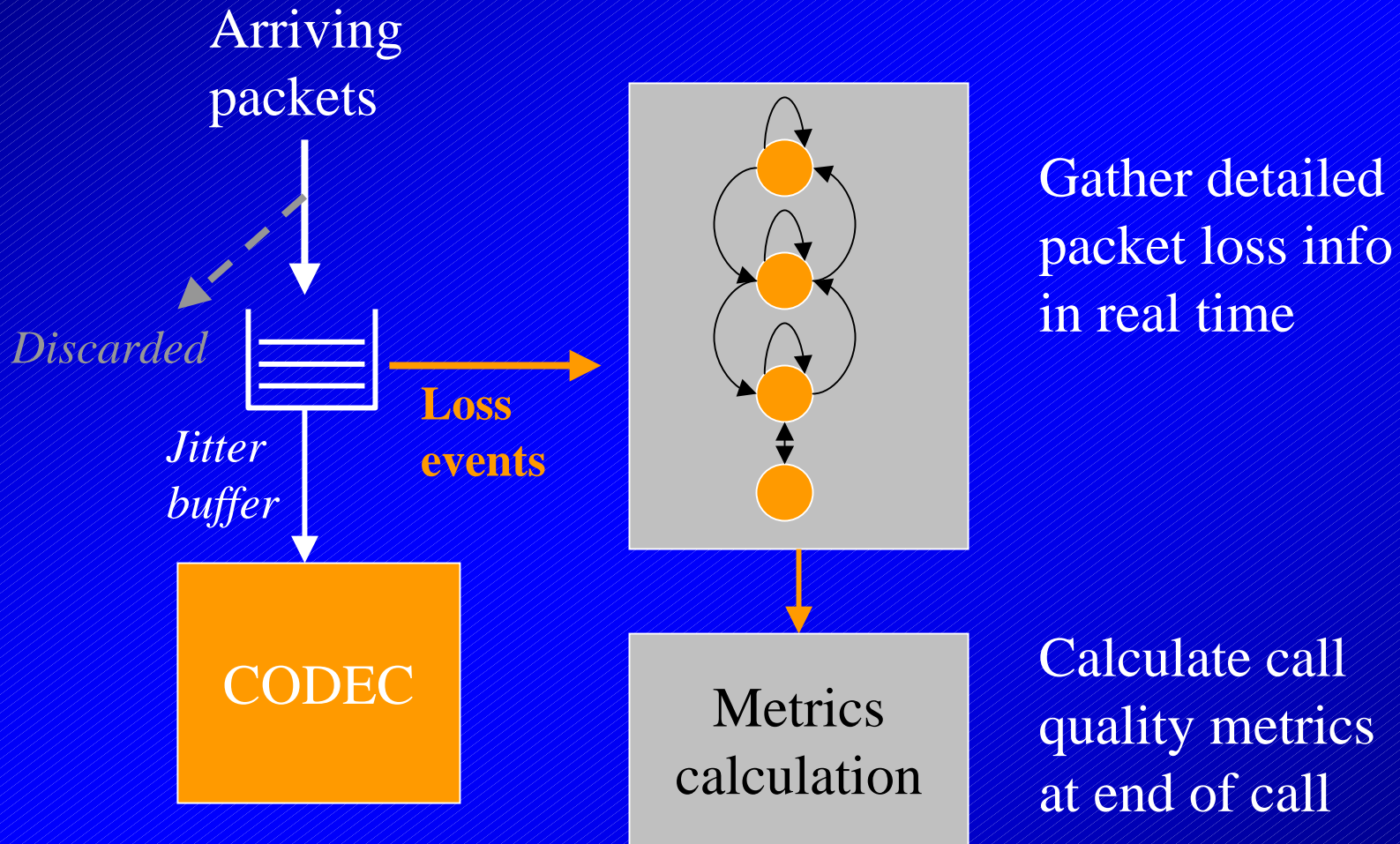
Impact on call quality?



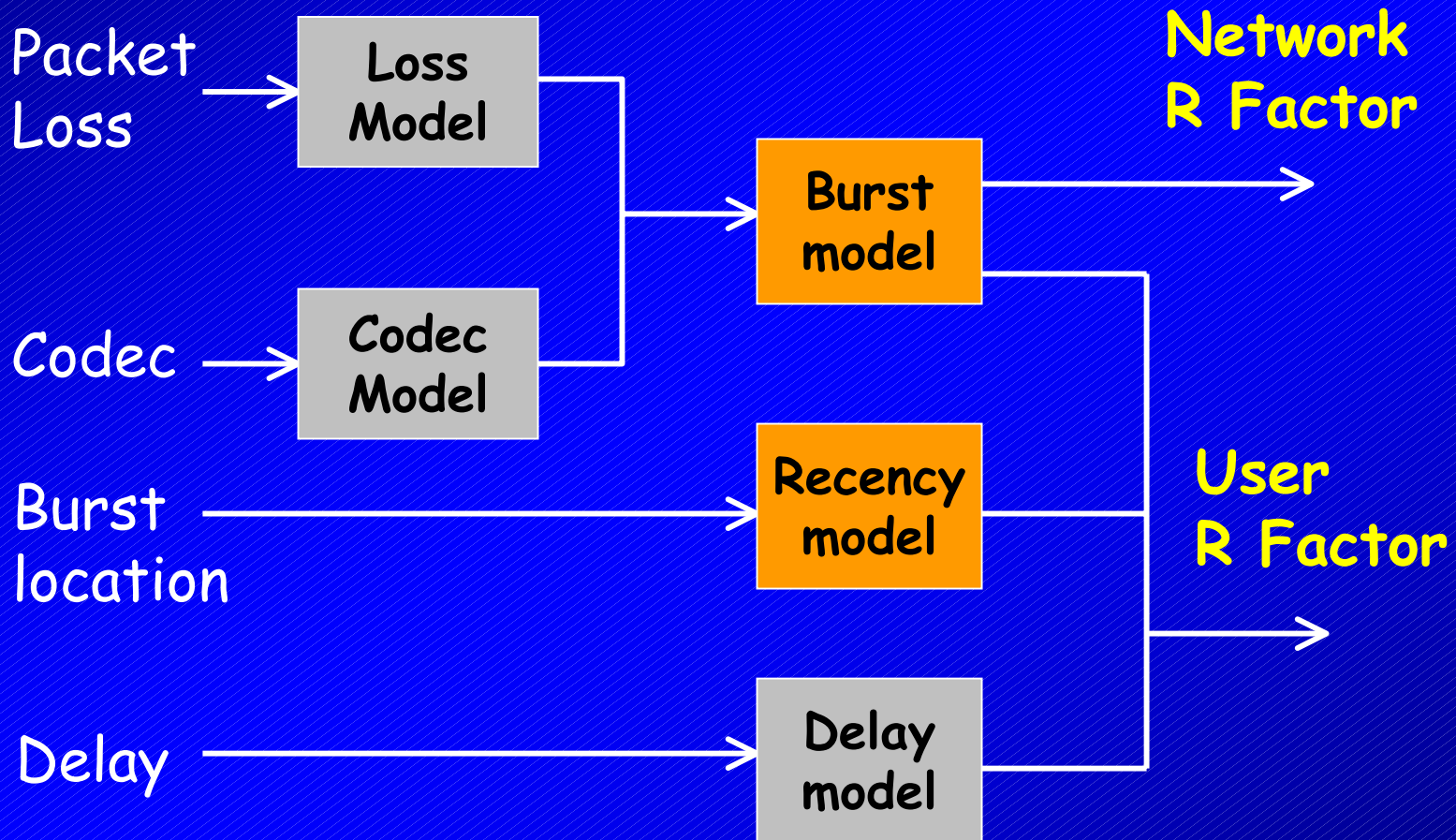
Call quality monitoring



How VQmon works

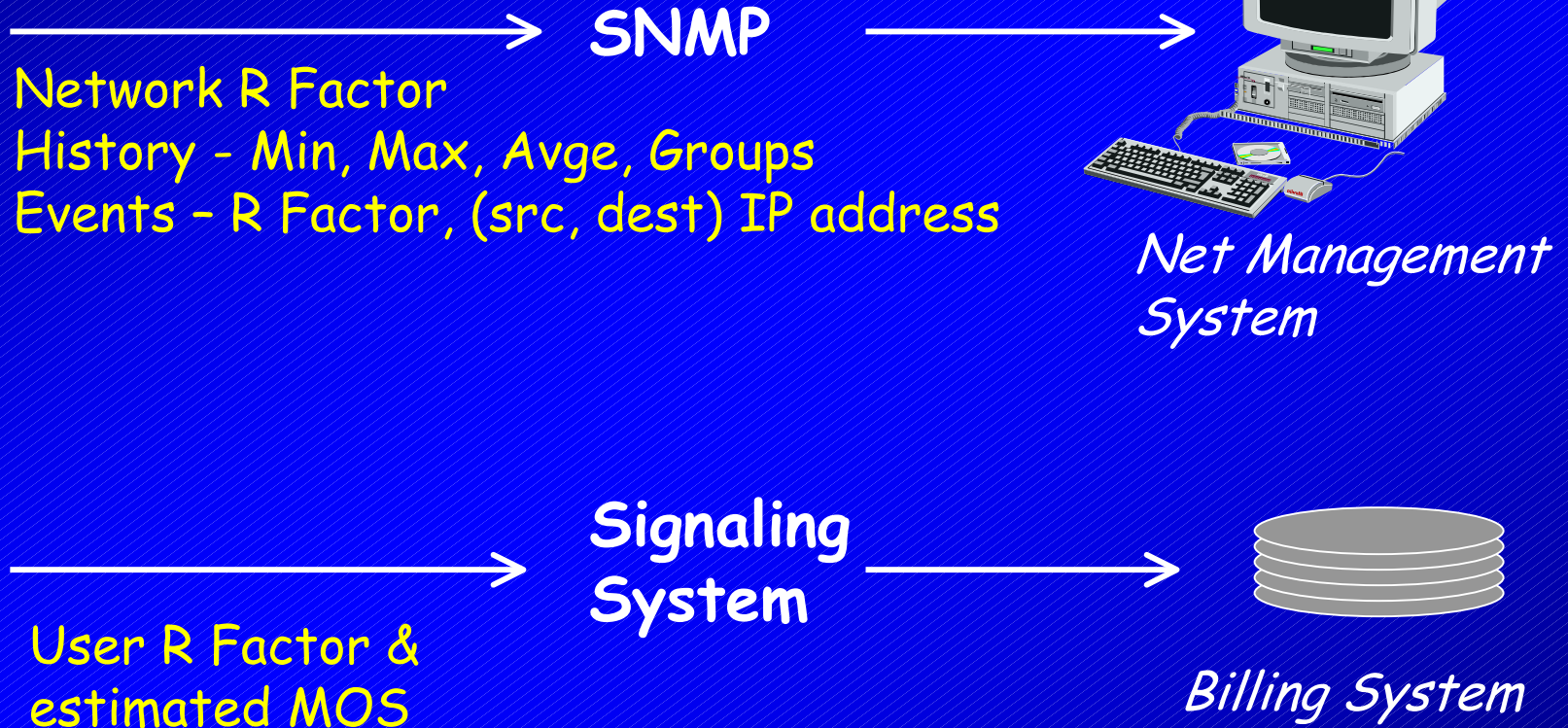


Extended E Model

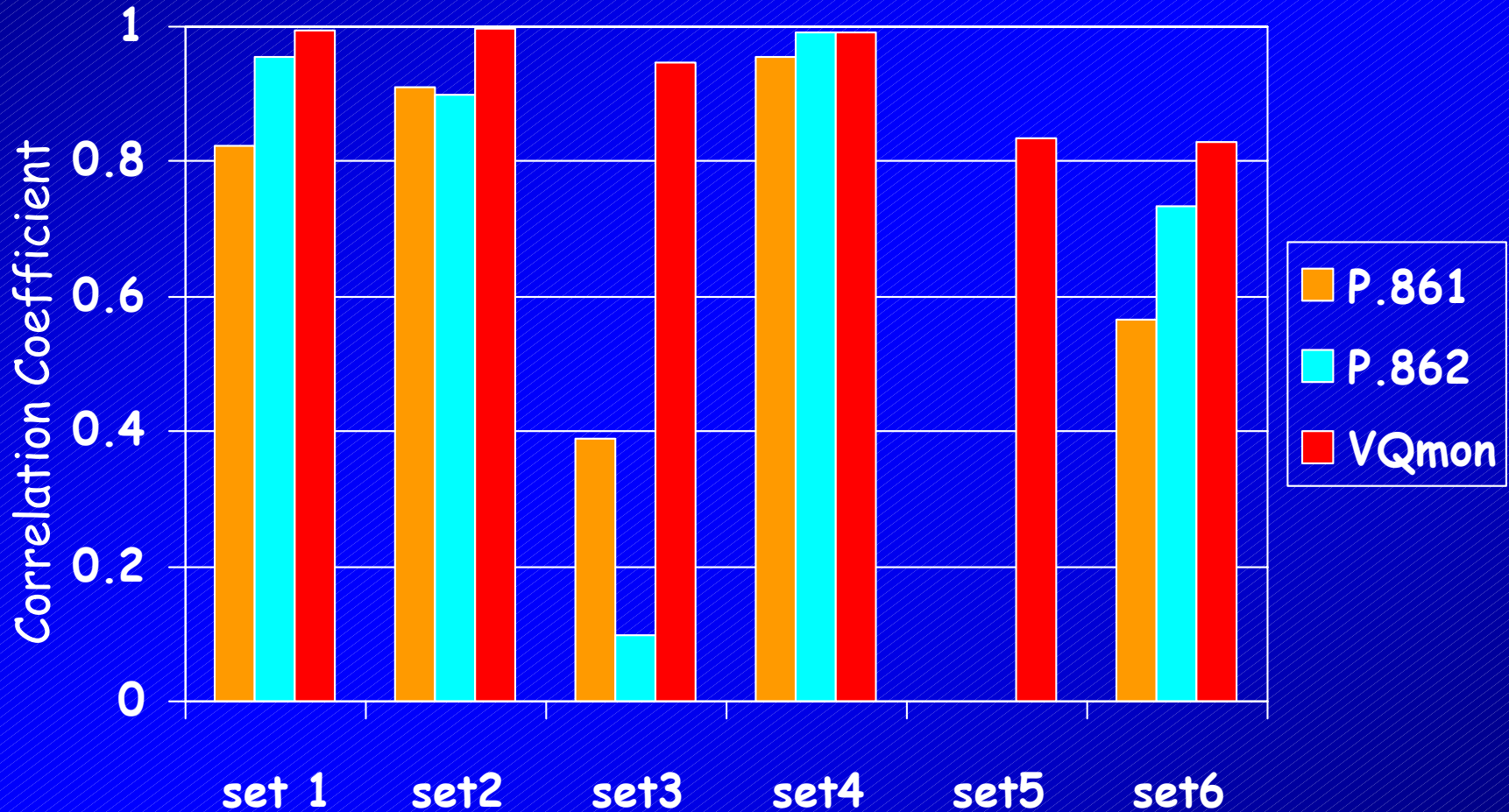


■ ITU E Model

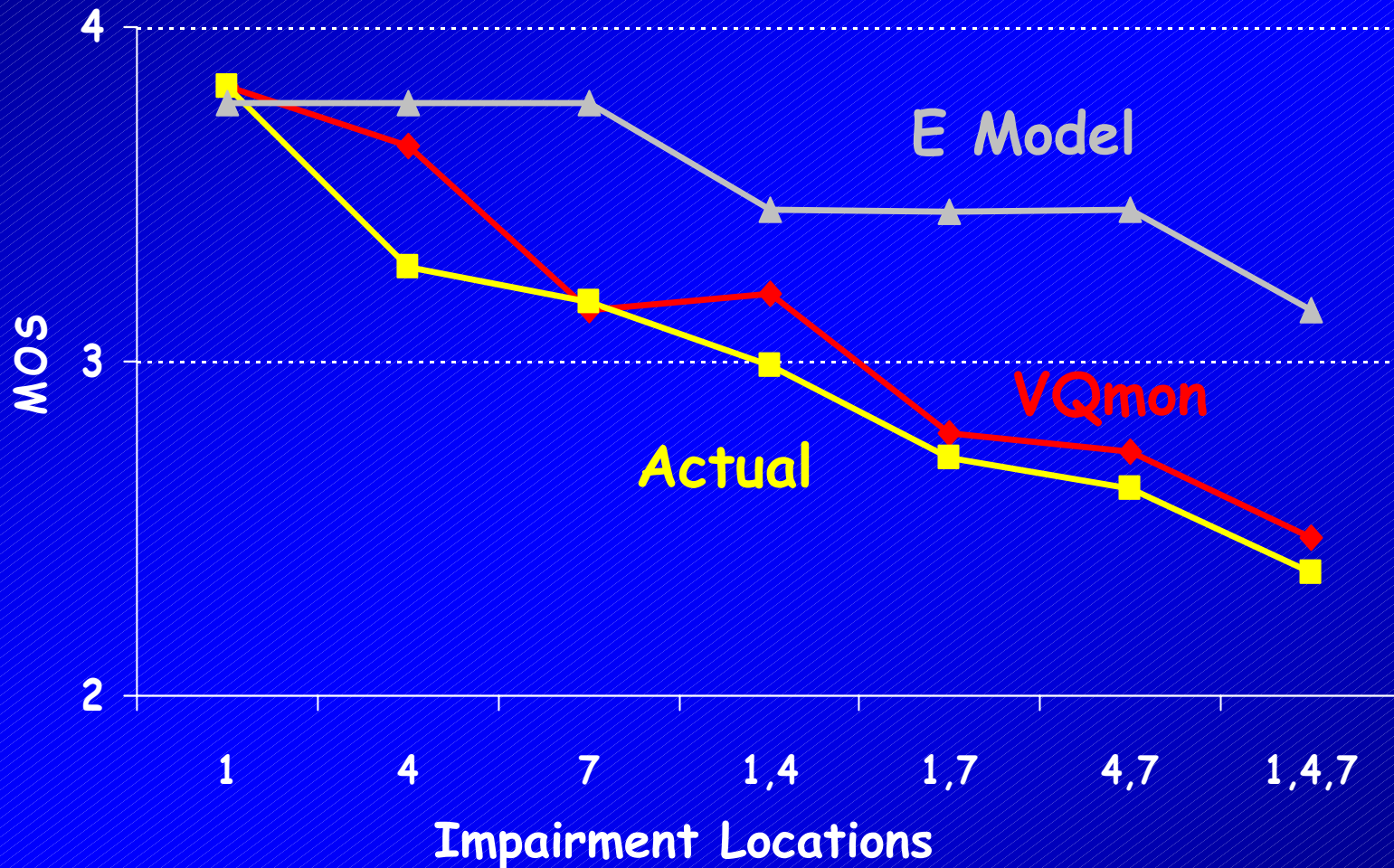
Call Quality Metrics



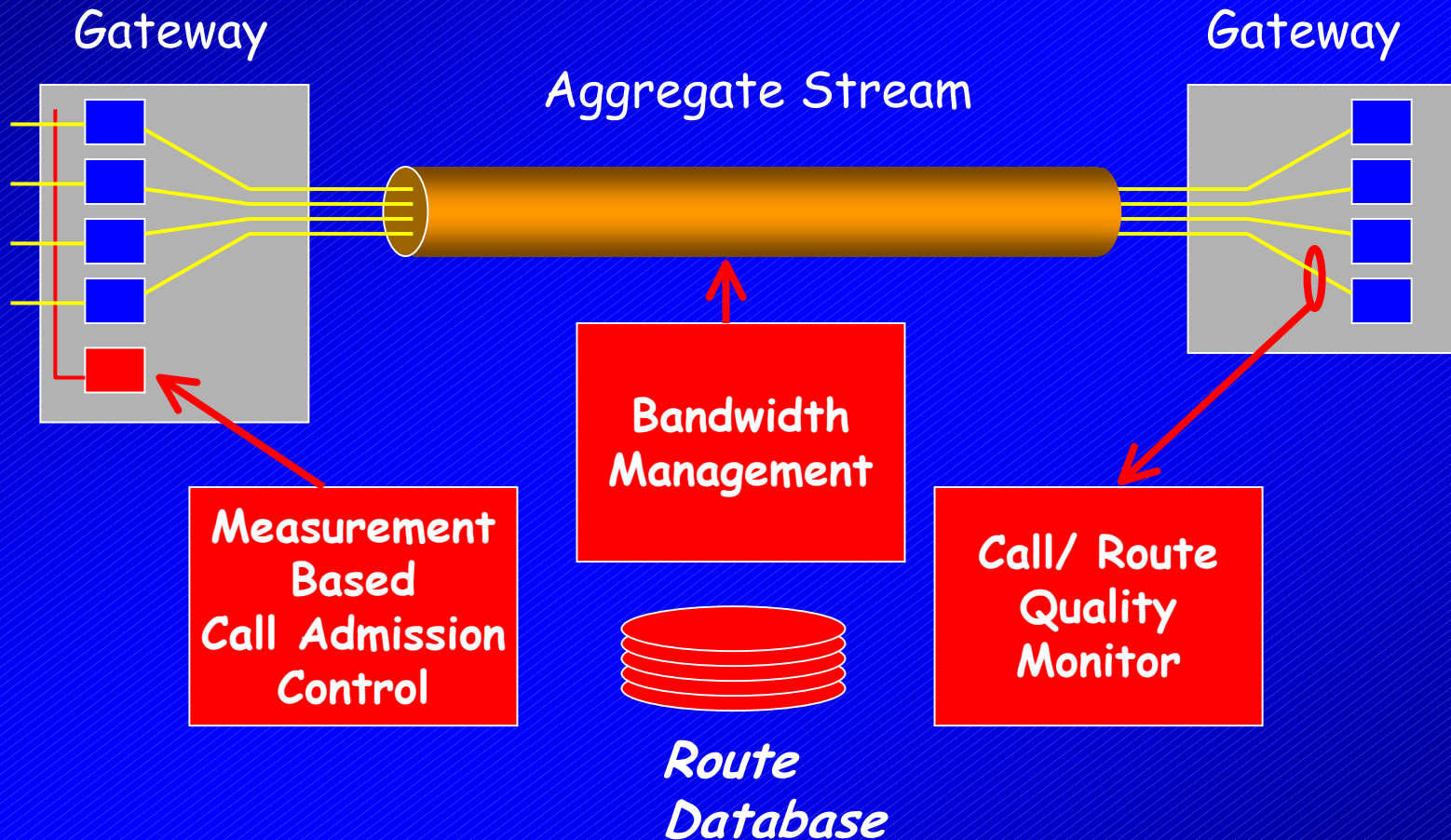
Comparison with PSQM, PESQ



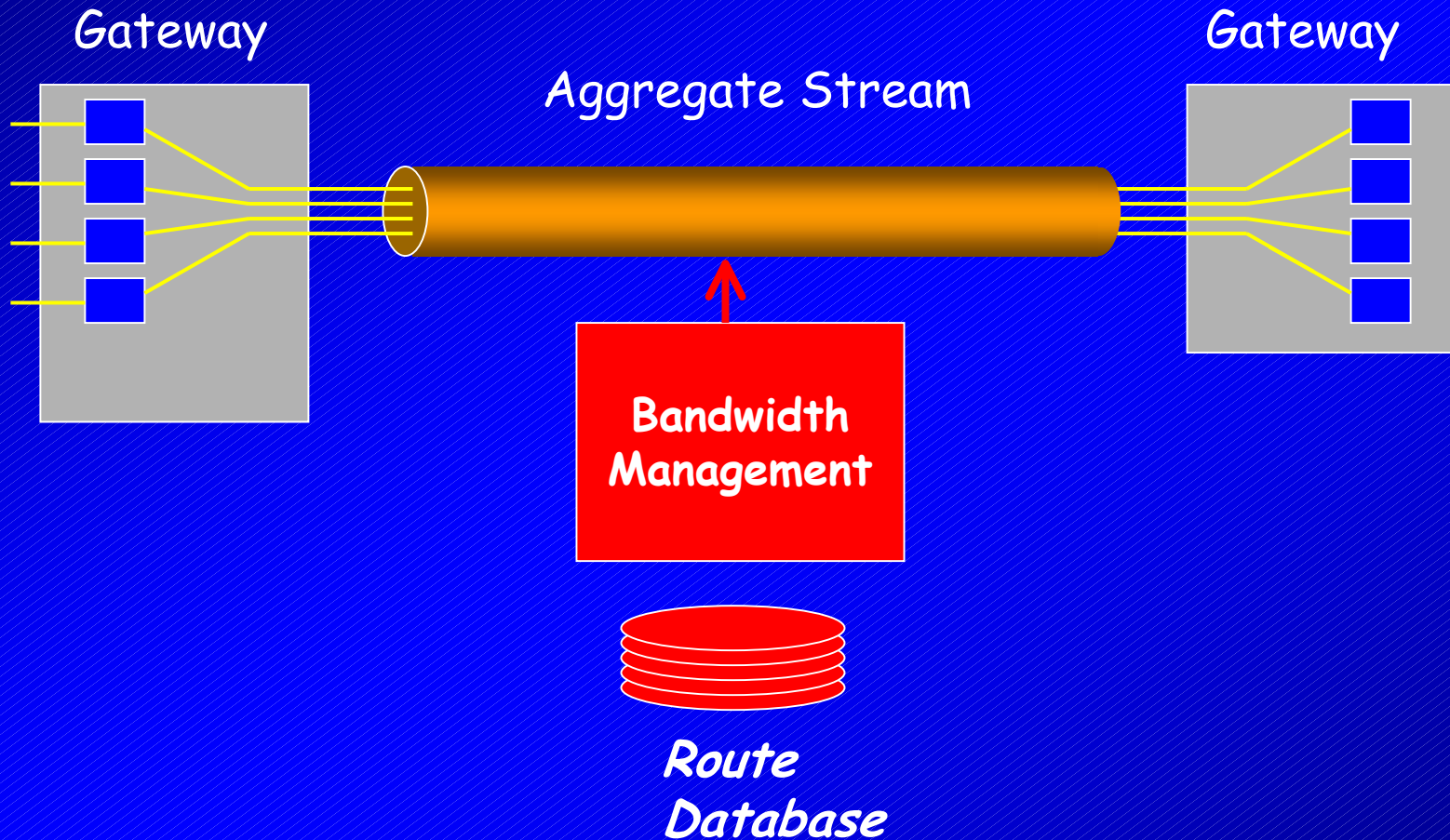
Comparison with E Model



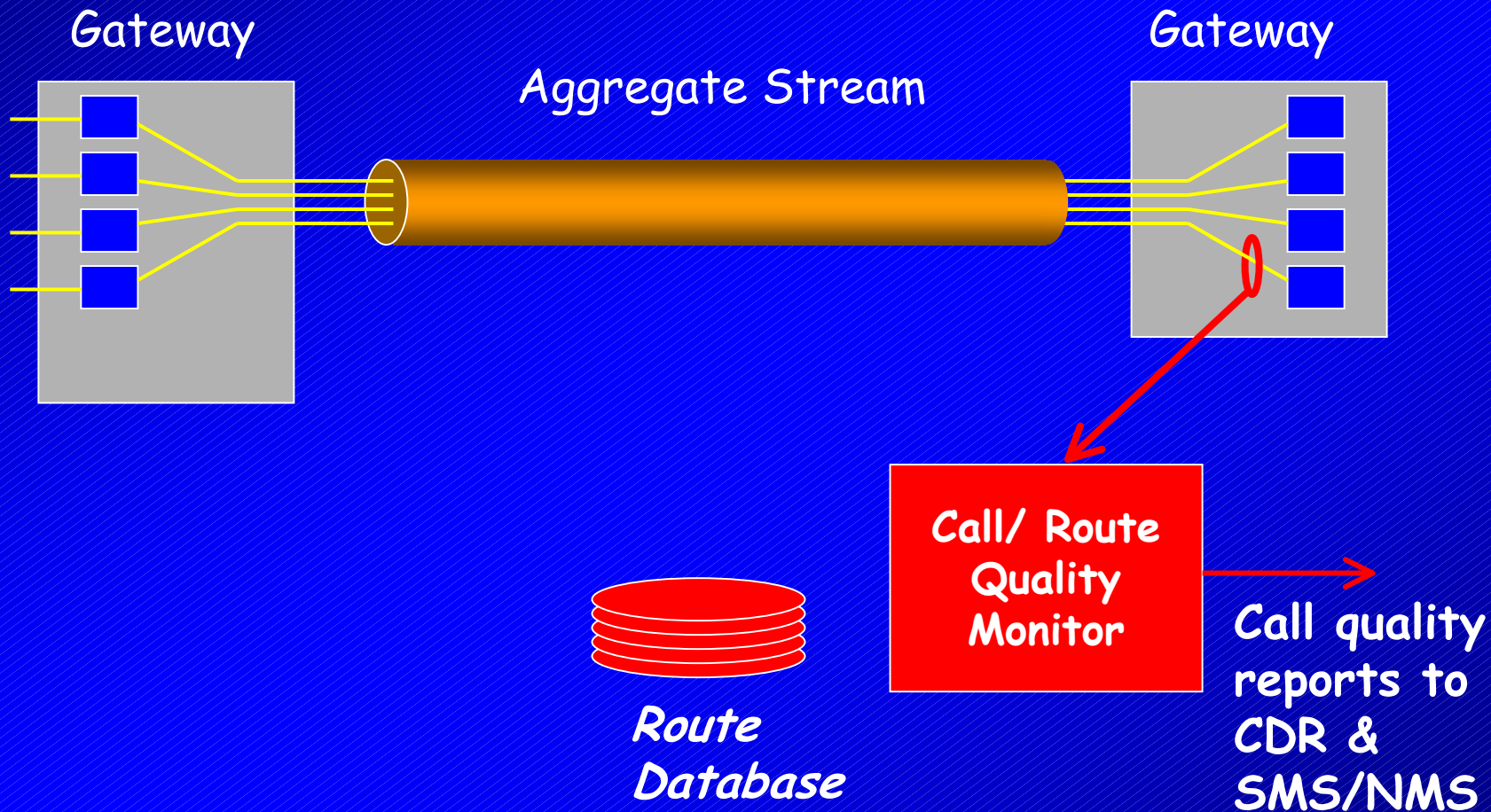
Managing QoS



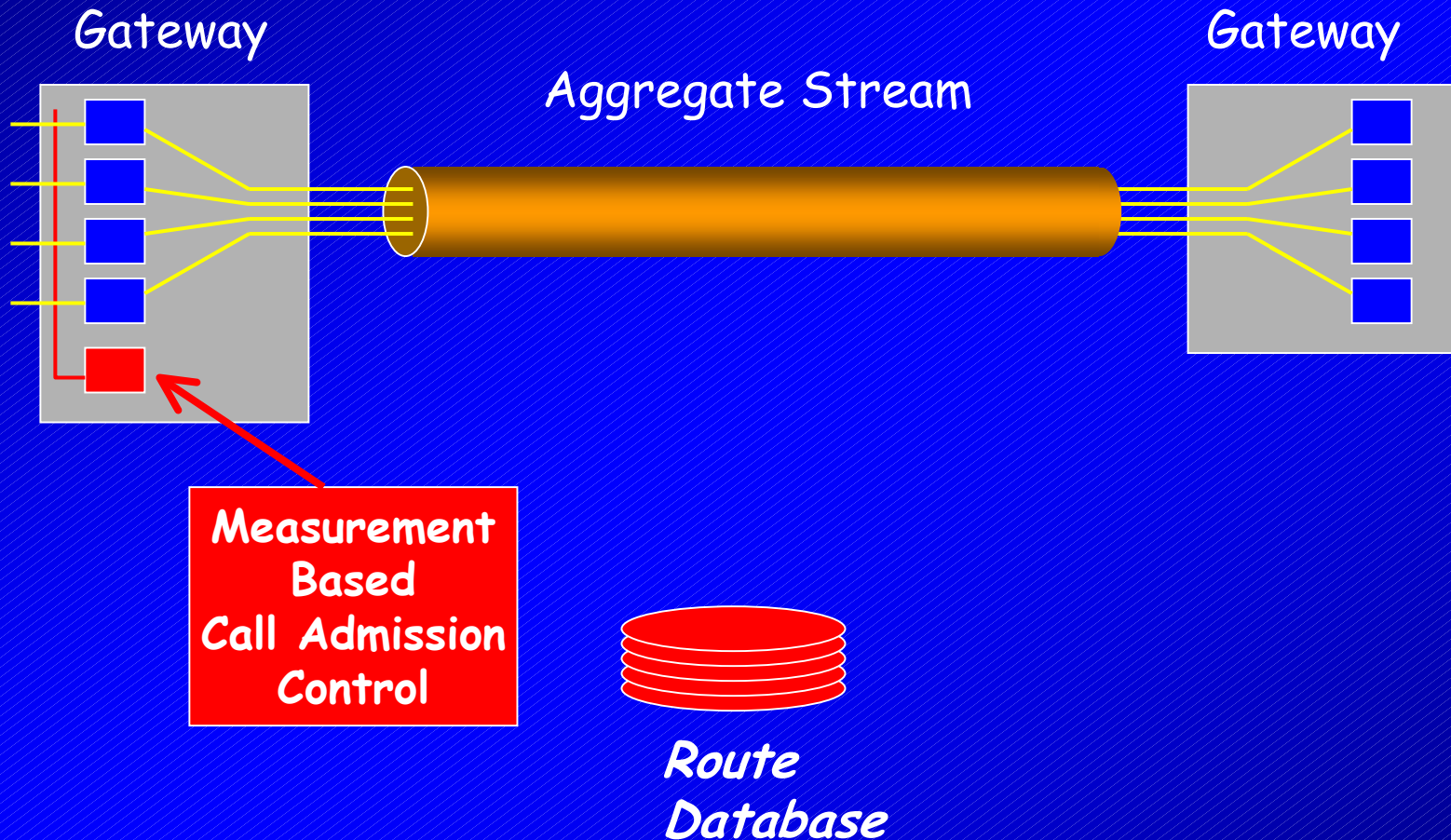
Reserve bandwidth



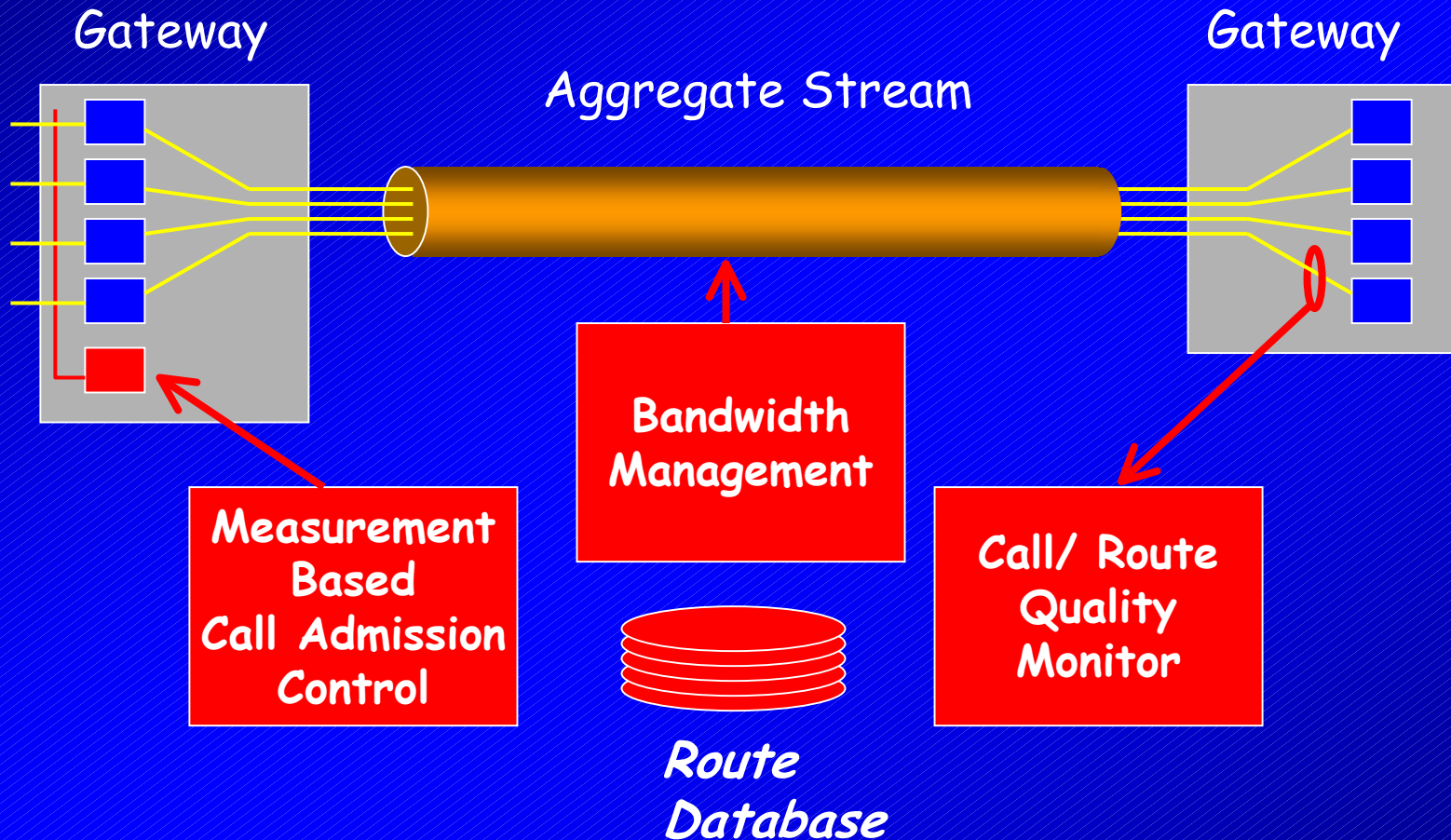
Monitor Quality



Call Admission Control



QoS Architecture



Managing QoS

- Accurate real time monitoring of call quality
- Represent effects of time varying effects
- Bandwidth reservation
- Call admission control