

# STATISTICAL TIME DIVISION MULTIPLEXING ARCHITECTURES AND DESIGN

A2

15 mV

Asadullah Shah  
Asadullah Shaikh  
Muniba Shaikh  
Zeeshan Bhatti  
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Dini Oktarina Dwi Handayani  
Zoya Shah

200mV

20mV



0.1 500ns

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INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

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## Editors

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## 19. Dynamic Talker Activity Analysis

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### 19.0 Abstract

Speech activity and non-activity is a scenario in which each activity (talkspurt) and non-activity (silence) may vary in size. Some talkspurts may be many frames and others may be only a few frames long, considering each frame of speech of 20-30ms. In this chapter a dynamic talker activity analysis is provided through statistical measures to describe the dynamics of the speech sources.

Assuming that each sources as shown in figure issuing talkspurts and falls into silent states on a random basis. The arrival of traffic at the input of the multiplexer can be approximated by Poisson process. The analysis of the traffic arrival at the multiplexer as shown in figure can be performed by a simple binomial process for the steady state probability of the number  $k$  of active talkers at any time instant of  $T_f$ . Assuming  $n$  talkers with each talker switching alternatively between talkspurts and silences. Let the random process  $a(t)$  represents the number  $k$  of active talkers (i. e. issuing talkspurts) at a given time. The steady-state probability that  $a(t) = k$  can be active found easily from the following formulation, the details of the analysis are given.

$$P_k = \binom{n}{k} q^k (1 - q)^{n-k} = b(k, n, q)$$

Equation 19-1

$P_k$  is the probability of  $k$  users issuing talkspurts,  $n$  is total number of users on the link and  $q$  is the activity factor of each user and can be computed from Equation.

$$q = \frac{Av_{act}}{Av_{act} + Av_{sil}}$$

Equation 19-2

The figures illustrate the real scenario of the source talkspurts and their dynamic variations over the link for  $n = 9, 10$  users respectively. From this, it is very difficult to determine and analyze