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## Differentiating Congestion Vs. Random Loss: A Method For Improving TCP Performance Over Wireless Links

Tech ID: 10189 / UC Case 2000-352-0

### BACKGROUND

Mobile users worldwide are increasingly using wireless devices to access the internet, and thus, there is a greater need for reliable client-server communications over wireless links. However, the current internet protocol for reliability, TCP, has demonstrated severe performance problems when operated over wireless links. TCP has multiple problems with its congestion control algorithms because TCP can only use packet loss to detect congestion in the network. In addition, wireless links are inherently inferior and suffer from long periods of fading. TCP has no mechanism to differentiate these losses from congestion, so it treats all losses as congestive by reducing its transmission window. This effectively reduces the throughput of the connection by more than half.

### DESCRIPTION

University of California scientists have developed a breakthrough method that can identify network losses as either random or congestive. In addition, this new method responds appropriately to all network losses. By identifying random losses at the TCP source, the revolutionary system eliminates the need to reduce the TCP's transmission rate for non-congestive losses.

### APPLICATIONS

- ▶ Wireless internet communications

### ADVANTAGES

The new UC technology provides the following benefits:

- ▶ Accurately determines random wireless losses
- ▶ Provides quick and efficient error-recovery
- ▶ Provides high throughput and low end-to-end delay and delay variance over networks with a simple bottleneck link

### PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	7,200,111	04/03/2007	2000-352

### ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ Scalable Integrated Services Architecture for Computer Networks
- ▶ Carrier Sense Multiple Access With Collision Avoidance And Pilots (CSMA/CAP)

### CONTACT

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### INVENTORS

- ▶ Garcia-Luna-Aceves, JJ

### OTHER INFORMATION

#### KEYWORDS

Wireless, wireless internet, TCP, TCP performance, wireless links, wireless networks, Cat3

#### CATEGORIZED AS

- ▶ **Communications**
  - ▶ Networking
  - ▶ Wireless
- ▶ **Computer**
  - ▶ Other
- ▶ **Engineering**
  - ▶ Other

#### RELATED CASES

2000-352-0

▶ [Interference Management for Concurrent Transmission in Downlink Wireless Communications](#)

▶ [Tree-Based Ordered Multicasting in Computer Networks](#)

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