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**Backholm et al.**

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(54) **DETECTION AND REPORTING OF  
KEEPALIVE MESSAGES FOR  
OPTIMIZATION OF KEEPALIVE TRAFFIC  
IN A MOBILE NETWORK**

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CPC ..... **H04W 76/25** (2018.02); **H04L 43/10**  
(2013.01); **H04L 69/16** (2013.01)

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See application file for complete search history.

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(57) **ABSTRACT**

Detection of network transactions or keepalives for main-  
taining long lived connections are disclosed. A keepalive  
detector can detect keepalive traffic based on keepalive  
parameters determined from an analysis of socket level  
network communication log data that record data transfer  
events including data sent from mobile applications or  
clients on a mobile device and data received by the mobile  
applications or clients on the mobile device, timing char-  
acteristics, protocol types, etc. Various statistical analyses can  
be performed on the network communication data to detect  
keepalives, taking into account variability in intervals of the  
data transfer events and sizes of data sent and received on  
each event. The keepalive detector can also detect keepal-  
ives from stream data on a mobile device by analyzing  
socket level communication messages including timing  
characteristics and amount of data transferred to detect  
keepalives and report keepalives using a data structure.

**20 Claims, 19 Drawing Sheets**

