

Project	IEEE 802.16 Broadband Wireless Access Working Group < <a href="http://ieee802.org/16">http://ieee802.org/16</a> >
Title	Text Modification for Draft 802.16m Evaluation Methodology Document: 11.1 Web Browsing (HTTP) Traffic Model
Date Submitted	2007-5-04
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Re:	IEEE 802.16m-07/014r1, "Call for Comments on Draft 802.16m Evaluation Methodology Document"
Abstract	This contribution proposes a text modification on the "Web Browsing (HTTP) Traffic Model" section (section 11.1) of the Draft 802.16m Evaluation Methodology Document
Purpose	Propose the text and table changes to provide a recent web browsing traffic model.
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# Text Modification for Draft 802.16m Evaluation Methodology:

## 11.1 Web Browsing (HTTP) Traffic Model

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### I. Introduction

1. The reference [39] and [40] used in section 11.1 in IEEE C802.16m 07/080r1 were written more than 6 years ago, and the web traffic model may be outdated. In this contribution a recent web traffic model is provided.
2. Uplink Web browsing is uncommon scenario unless end users are running web server from user devices. The UL parameters in the Table 11.1-1 and the section 11.1.2 need to be removed.

### II. Text Proposal

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text-----

*[Add the following references after the line#35 of the page#11 in C802.16m-07/080r1]*

- [1] [Bong Ho Kim, "Application traffic model," http://www.flyvo.com/archive/Posdata-application\\_traffic\\_model.pdf, 2007](http://www.flyvo.com/archive/Posdata-application_traffic_model.pdf)
- [2] [comScore Media Metrix Releases January Top 50 Web Rankings and Analysis; http://www.comscore.com/press/release.asp?press=1214](http://www.comscore.com/press/release.asp?press=1214)

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*[change text and Table 11.1-1: line#21 of the page#59 in C802.16m-07/080r1]*

In addition to the model parameters, HTTP traffic behavior is also dependent on the HTTP version used. Currently HTTP 1.0 and HTTP 1.1 are widely used by servers and browsers [36]-[39]. In HTTP 1.0, also known as burst mode transfer, a distinct TCP connection is used for each object in the page, thereby facilitating simultaneous transfer of objects. The maximum number of simultaneous TCP connections is configurable, with most browsers using a maximum of 4 simultaneous TCP connections. In HTTP/1.1, also known as persistent mode transfer, all objects are transferred serially over a single persistent TCP connection.

[A recent measurements and analysis for web page structures can be found in , and the measurements have been performed using a recent online-traffic analysis provided by market research firm ComScore Media Metrix, which examined number of visitors among the 50 top Web sites on January 2007. The paper, , includes web page sizes and compositions of the 50 top web sites after analyzing 25000 measurements, and each web site has](#)

been visited 500 times for three weeks from April 7 to April 23 in 2007. Each web site visits are about one minute apart, and the same web site visits are about an hour apart. Table 11.1-1 provides the model parameters for HTTP traffic ~~for downlink and uplink connections~~ based on the measurements in [1] and the model in [39]-[40].

Component	Distribution	Parameters		PDF
		Downlink	Uplink	
Main object size (S <sub>M</sub> )	Truncated Lognormal	Mean = <del>40740</del> <u>52390</u> bytes SD= <del>25032</del> <u>49591</u> bytes Min = <del>400</del> <u>1290</u> bytes Max = <del>2</del> <u>0.25</u> Mbytes $\sigma$ 1.37, $\mu$ 8.3 $\sigma$ 0.8, $\mu$ 10.55	<del>Mean = 9055</del> bytes <del>SD = 13265</del> bytes <del>Min = 100</del> bytes <del>Max = 100</del> Kbytes $\sigma$ 1.37, $\mu$ 8.3	$f_x = \frac{1}{\sqrt{2\pi\sigma}} \exp\left(-\frac{\ln x - \mu}{\sigma}\right)^2, x > 0$ if x>max or x<min, discard and generate a new value for x
Embedded object size (S <sub>E</sub> )	Truncated Lognormal	Mean = <del>7758</del> <u>8551</u> bytes SD = <del>426168</del> <u>59232</u> bytes Min = <del>50</del> <u>5</u> bytes Max = <del>2</del> <u>6</u> Mbytes $\sigma$ 2.36, $\mu$ 6.1 $\sigma$ 1.97, $\mu$ 7.1	<del>Mean = 5958</del> bytes <del>SD = 11376</del> bytes <del>Min = 50</del> bytes <del>Max = 100</del> Kbytes $\sigma$ 1.69, $\mu$ 7.5	$f_x = \frac{1}{\sqrt{2\pi\sigma}} \exp\left(-\frac{\ln x - \mu}{\sigma}\right)^2, x > 0$ if x>max or x<min, discard and generate a new value for x
Number of embedded objects per page (N <sub>d</sub> )	Truncated Pareto	Mean = <del>5.64</del> <u>51.1</u> Max. = <del>53</del> <u>165</u>	<del>Mean = 4.229</del> <del>Max. = 53</del> $\alpha$ 1.1, $k$ 2, $m$ 55	$f_x = \frac{\alpha^k}{\alpha - 1} x^{-\alpha}$ $f_x = \frac{k}{m}$ Subtract k from the generated random value to obtain N <sub>d</sub> if x>max, discard and regenerate a new value for x
Reading time (D <sub>pc</sub> )	DL: Exponential UL: Uniform	Mean = 30 sec	<del>Mean = 5</del> sec $\lambda$ 0.033 $a$ 0, $b$ 10	DL: $f_x = \lambda e^{-\lambda x}, x > 0$ UL: $f_x = \frac{1}{b-a}, a < x < b$
Parsing time (T <sub>p</sub> )	Exponential	Mean = 0.13 sec	<del>Mean = 0.13</del> sec $\lambda$ 7.69	$f_x = \lambda e^{-\lambda x}, x > 0$

Table 01.1-1: HTTP Traffic Model

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text-----

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text-----

*[Remove section 11.1.2: line#11 of the page#61 in C802.16m-07/080r1]*

**~~11.1.2. HTTP and TCP interactions for UL HTTP traffic~~**

~~HTTP/1.1 is used for UL HTTP traffic. For details regarding the modeling of the interaction between HTTP traffic and the underling TCP connection, refer to 4.2.4.1, 4.2.4.2 of [41].~~

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