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PATENT

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

ATTY DOCKET NO.: 5577-116
DATE: November 13, 1998

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UTILITY PATENT APPLICATION TRANSMITTAL LETTER
AND FEE TRANSMITTAL FORM (37 CFR 1.53(b))

BOX PATENT APPLICATION
Assistant Commissioner for Patents
Washington, DC 20231

Sir:

Transmitted herewith for filing under 37 CFR 1.53(b) is:

- a patent application
- a Continuation a Divisional a Continuation-in-Part (CIP)
of prior application no.: ; filed
- A Small Entity Statement(s) was filed in the prior application; Status still proper and desired.

Inventor(s) or Application Identifier:

**Stephen B. Baber; Kathryn H. Britton; John R. Hind;
Barron C. Housel, III and Ajamu Akinwunmi Wesley**

Entitled: **METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR
DIFFERENCING DATA COMMUNICATIONS USING A MESSAGE QUEUE**

Enclosed are:

1. Application Transmittal Letter and Fee Transmittal Form (*A duplicate is enclosed for fee processing*)
2. 39 pages of Specification (including 28 claims)
3. 9 sheets of Formal Drawings (35 USC 113)
4. Oath or Declaration
 - a. newly executed (*original or copy*)
 - b. copy from prior application (37 CFR 1.63(d) (*for continuation/divisional*) [Note Box 5 Below])
 - c. DELETION OF INVENTOR(S) (*Signed statement deleting inventor(s) named in the prior application*)
5. Incorporation By Reference (*useable if box 4b is checked*)
The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
6. Microfiche Computer Program (*Appendix*)
7. Assignment papers (*cover sheet(s) and document(s)*)
8. Small Entity Statement(s)
9. Information Disclosure Statement, PTO-1449, and references cited
10. Preliminary Amendment (*Please enter all claim amendments prior to calculating the filing fee.*)
11. English Translation Document
12. Certified Copy of Application No. ; Filed

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- 13. Sequence Listing/ Sequence Listing Diskette
 - a. computer readable copy
 - b. paper copy
 - c. statement in support
- 14. An Associate Power of Attorney
- 15. Return Receipt Postcard (MPEP 503) (Should be specifically itemized)
- 16. Other:

The fee has been calculated as shown below:

	Column 1 No. Filed	Column 2 No. Extra	Small Entity Rate Fee	Large Entity Rate Fee
BASIC FEE			\$395.00	\$790.00
TOTAL CLAIMS	28- 20 =	8	x 11 = \$	x 22 = \$176.00
INDEP CLAIMS	4 - 3 =	1	x 41 = \$	x 82 = \$82.00
<input type="checkbox"/> MULTIPLE Dependent Claims Presented			+ 135 = \$	+ 270 = \$.
<i>If the difference in Col. 1 is less than zero, Enter "0" in Col. 2</i>			Total \$	Total \$1048.00

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- The Commissioner is hereby authorized to credit overpayments or charge the following fees associated with this communication to Deposit Account No. 09-0461.
 - a. Additional filing fees under 37 CFR 1.16 for presentation of extra claims.
 - b. Additional patent application processing fees under 37 CFR 1.17.

Respectfully submitted,

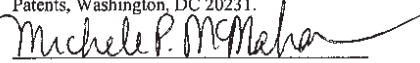

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CERTIFICATE OF EXPRESS MAILING

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I hereby certify that this correspondence is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to Box Patent Application, Assistant Commissioner For Patents, Washington, DC 20231.


 Michele P. McMahan
 Date of Signature November 13, 1998

METHODS, SYSTEMS AND COMPUTER PROGRAM
PRODUCTS FOR DIFFERENCING DATA COMMUNICATIONS
USING A MESSAGE QUEUE

Abstract of the Invention

Method, apparatus and program products for increasing the performance of communications using differencing data communications over a message queue supporting asynchronous communications from a variety of applications executing on a source device over a shared external communication link to destination devices are provided. A data stream between the source device and the destination device is segmented based on the type of the data stream to provide a logical segmentation which increases the occurrence of repeated transmissions of a segment. The segments are then placed in the message queue as a message for transport to a destination computer. Differencing is provided by replacing the segment with an associated identifier for segments which have previously been transported to provide a reduced volume of data for transmittal based on recognition and replacement of data segments which have previously been transmitted by the source device. The destination device receives the transmitted reduced segments as messages in a receive message queue and reconstructs the data stream. Synchronization between the differencing caches of the devices is not required as the communication is asynchronous through a message queue and, if a reduced segment is not recognized, retransmission of the complete segment instead of the associated identifier may be requested and the source device creates and queues the segment as a message.

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Attorney Docket No.: 5577-116

METHODS, SYSTEMS AND COMPUTER PROGRAM
PRODUCTS FOR DIFFERENCING DATA COMMUNICATIONS
USING A MESSAGE QUEUE

Field of the Invention

5 The present invention relates to communications between devices over a network. More particularly, the present invention relates to communications over a low-speed or wireless communication link between two computers using a message queue.

Background of the Invention

10 Traditional mainframe computer configurations provided for user interface to the computer through computer terminals which were directly connected by wires to ports of controllers connected by channels to the mainframe computer. As computing technology has evolved, processing power has typically evolved from a central processing center with a number of relatively low-processing power terminals to a distributed environment of networked processors. Examples of this shift in processing include local or wide area networks which interconnect 15 individual work stations where each workstation has substantial independent processing capabilities. This shift may be further seen in the popularity of the Internet which interconnects many processors and networks of processors through devices such as, for example, routers.

20 At the same time that processing power was becoming more distributed there was also an increase in the popularity of mobile computing. The use of laptops, notebooks, Personal Digital/Communication Assistants (PDAs/PCAs) and

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5 other portable devices has led to an increase in demands for wireless communications. Wireless communication allows a user freedom to move within the wireless environment while remaining "connected" to a network. Furthermore, a wireless connection to a network allows a portable processor user the convenience of connecting to a network without having to plug into a docking station or use some other method of "hardwiring" to a network. However, wireless wide area networks, cellular communications and packet radio, suffer from common limitations such as the high cost per byte of communications, slow response time, low bandwidth and unreliability which all hamper use of wireless technology.

10 Even outside of the portable processing arena wireless communications have seen an increase in popularity. Thus, as a result of infrastructure limitations, cost or convenience, it is becoming more frequent that a network linking two devices wishing to communicate may include a low through-put component such as a wireless network link.

15 Communications between devices such as computers are typically disadvantaged particularly on lower through-put network legs, such as wireless legs (or highly congested legs which are effectively bandwidth limited), where bandwidth limitations result in slower response time for communications between the computers. In the extreme, protocol timeouts may even cause transmission errors and resulting retransmissions or even inability of the communication system to operate. Thus, utilizing wireless technology, or any low-speed communication technology, for data communication between applications executing on computers exacerbates the weaknesses of the wireless technology.

20 Communications are further complicated where a plurality of applications executing on a computer perform operations requiring transmission of data streams over a shared port to an external communication link, on occasion with interruptions in session connections. It is known to provide for this shared access using asynchronous message queuing systems such as International Business Machine Corporation's Message Queuing Series ("MQSeries"),
25 Telecommunications Access Method ("TCAM"), or Information Management

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