EXHIBIT N

US006473609B1

(12) **United States Patent**
Schwartz et al.

(10) **Patent No.: US 6,473,609 B1**
(45) **Date of Patent: Oct. 29, 2002**

(54) **METHOD AND ARCHITECTURE FOR INTERACTIVE TWO-WAY COMMUNICATION DEVICES TO INTERACT WITH A NETWORK**

(75) Inventors: **Bruce V. Schwartz**, San Mateo; **Russell S. Greer**, Los Gatos; **Stephen S. Boyle**, Fremont; **Mark A. Fox**, San Mateo; **Alain S. Rossmann**, Palo Alto; **Mark G. Lentczner**, Mountain View; **Andrew L. Laursen**, San Mateo; **Brad E. Sandman**, Sunnyvale, all of CA (US)

(73) Assignee: **Openwave Systems Inc.**, Redwood City, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/153,322**

(22) Filed: **Sep. 14, 1998**

Related U.S. Application Data

(63) Continuation-in-part of application No. 08/570,210, filed on Dec. 11, 1995, now Pat. No. 5,809,415.

(51) **Int. Cl.**[7] **H04Q 7/20**; H04Q 7/34

(52) **U.S. Cl.** **455/406**; 455/422; 455/426; 455/414; 455/550; 455/408; 455/403

(58) **Field of Search** 455/403, 422, 455/426, 414, 445, 411, 412, 550, 556, 466, 517, 406, 407, 408; 701/213

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,787,028 A 11/1988 Finfrock et al.
4,812,843 A 3/1989 Champion, III et al.

(List continued on next page.)

FOREIGN PATENT DOCUMENTS

EP 0 646 856 A2 4/1995
EP 0691619 A2 1/1996

(List continued on next page.)

OTHER PUBLICATIONS

Meyer M et al: The On–The–Move Concept For Mobile Middleware Iss. World Telecommunications Congress. (International Switching Symposium), CA, Toronto, Pinnacle Group. 373–378, XP000704489.

(List continued on next page.)

Primary Examiner—William Trost
Assistant Examiner—Keith Ferguson
(74) *Attorney, Agent, or Firm*—Blakely, Sokoloff, Taylor & Zafman LLP

(57) **ABSTRACT**

The present invention is particularly applicable to navigation of Internet by two-way interactive communication mobile devices that are capable of wireless communication via a link server with service providers or network servers on the Internet. Despite the limited computing resources in mobile devices that make it economically and technically impractical for the mobile devices to operate a local browser functioning as if it was in a desktop computer, the present invention allows the mobile devices to interact effectively with the Internet using a control engine operating in the link server and an interface engine operating in the mobile devices. The control engine, which utilizes the computing resources of the link server device, is responsible for tasks that require considerable computing power and memory, such as processing of URL requests, interpretation of markup language files, management of data cache and variable states. Further, working with a message processor in the server device, the control engine communicates with an interface engine using a compact data format that is efficiently transportable in the wireless data network. The interface engine typically performs tasks that do not require considerable computing power and memory, such as receiving input data from users, and the rendering of the compact data format received from the link server device, to cause the mobile device to display contents in the markup language files on a display screen.

49 Claims, 19 Drawing Sheets