



- (51) **International Patent Classification:**
H04L 12/28 (2006.01) *H04L 12/56* (2006.01)
- (21) **International Application Number:**
PCT/US2012/059381
- (22) **International Filing Date:**
9 October 2012 (09.10.2012)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
12004107.4 28 May 2012 (28.05.2012) EP
- (71) **Applicant: ITRON, INC.** [US/US]; 2111 North Molter Road, Liberty Lake, WA 99019 (US).
- (72) **Inventors: POPA, Daniel;** C/o Itron Inc., 2111 North Molter Road, Liberty Lake, WA 99019 (US). **JETCHEVA, Jorjeta, Gueorguieva;** C/o Itron Inc., 2111 North Molter Road, Liberty Lake, WA 99019 (US). **MANI, Mehdi;** C/o Itron, Inc., 2111 North Molter Road, Liberty Lake, WA 99019 (US). **MAINAUD, Bastien;** C/o Itron, Inc., 2111 North Molter Road, Liberty Lake, WA 99019 (US).
- (74) **Agents: THOMPSON, David, S.** et al.; Lee & Hayes, PLLC, 601 W. Riverside Ave, Suite 1400, Spokane, WA 99201 (US).
- (81) **Designated States** (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.
- (84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,

[Continued on next page]

(54) Title: EFFICIENT MULTICAST IN A SMART GRID

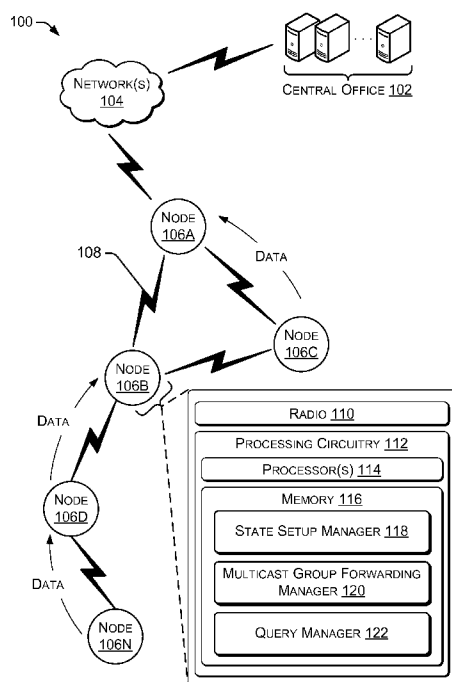


FIG. 1

(57) **Abstract:** In a wireless and/or power line communication (PLC) network environment, techniques for multicast of data and management of multicast groups assist in regulating bandwidth consumption and provision of desired multicast data. Nodes indicate interest in multicast groups by transmission of reports upstream. Report transmission may be suppressed to balance bandwidth with need for multicast data. Multicast data packets may be retransmitted downstream to fulfill requests indicated by the reports at a rate and/or frequency based on multicast packet duplication or redundancy. Information, such as broken links or "leave" packets, may indicate that one or more downstream nodes should be removed from a forwarding state. However such removal may impact other nodes. A query may be transmitted downstream, to determine if retransmission/forwarding of multicast retransmissions should continue. Query transmission may be based on a balance between query bandwidth consumption and the needs of downstream nodes.

TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, **Published:**
ML, MR, NE, SN, TD, TG).

— *with international search report (Art. 21(3))*