(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
24 October 2013 (24.10.2013)

WIPO | PCT

(10) International Publication Number
WO 2013/157008 A3

(51) International Patent Classification:
G06F 9/45 (2006.01)

(21) International Application Number:
PCT/IL2013/050338

(22) International Filing Date:
18 April 2013 (18.04.2013)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/625,800 18 April 2012 (18.04.2012) US

(71) Applicant: **GIZMOX LTD.** [IL/IL]; P. O. Box 2118, 44425 Kfar-Saba (IL).

(72) Inventor: **PELED, Guy**; 5 Burla Street, 43583 RaAnana (IL).

(74) Agents: **G. E. EHRLICH (1995) LTD.** et al.; 11 Menachem Begin Road, 5268104 Ramat Gan (IL).

(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: CODE MIGRATION SYSTEMS AND METHODS

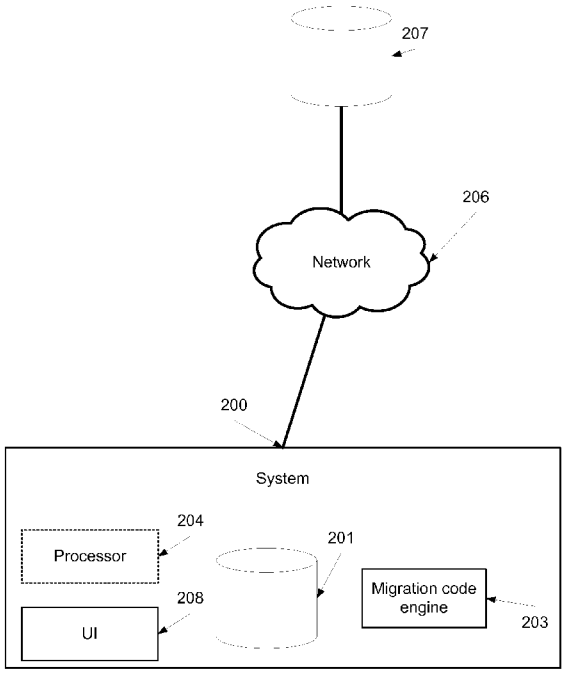

FIG. 2A

(57) Abstract: A method of converting a precompiled source code. The method comprises receiving a precompiled source code of an application, providing a plurality of AST segment patterns each associated with another of a plurality of replacement code templates, building an abstract syntax tree (AST) of the precompiled source code, matching between a first group of the plurality of AST segment patterns and a plurality of AST segments of the AST to identify a second group of the plurality of replacement code templates, the plurality of AST segments are associated with a plurality of source code segments of the precompiled source code, and performing a code migration process of the precompiled source code to a precompiled migrated code of the application using the second group.

WO 2013/157008 A3

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

Declarations under Rule 4.17:

— *of inventorship (Rule 4.17(iv))*

Published:

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

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

(88) Date of publication of the international search report:
12 December 2013

INTERNATIONAL SEARCH REPORT PCT/IL2013/050338 11.10.2013

International application No.
PCT/IL13/50338

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - G06F 9/45 (2013.01)
USPC - 717/144
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC(8): G06F 9/45, 17/10 (2013.01)
USPC: 717/144, 140, 143; 703/2

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
MicroPatent (US-G, US-A, EP-A, EP-B, WO, JP-bib, DE-C,B, DE-A, DE-T, DE-U, GB-A, FR-A); DialogPRO; IEEE; Google/Google Scholar; convert*, migrat*, source, AST, abstract syntax tree, segment, fragment, patern, match, code, coding, encrypt

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2011/0131548 A1 (COLTON, P et al.) 02 June 2011; Abstract, paragraph [0056], [0074], [0078]-[0080], [0092], [0136], [0139]	1-12, and 15-17
Y	US 2004/0068716 A1 (STEVENS, C) 08 April 2004; paragraph [0047]	1-12, and 15-17
Y	US 2010/0269096 A1 (ARAYA, C et al.) 21 October 2010; paragraph [0004], [0026], [0040], [0048], [0054], [0055]	3, 6, and 7
Y	US 2005/0166193 A1 (SMITH, J et al.) 28 July 2005; paragraph [0255]	10
Y -- A	US 2006/0178858 A1 (TROWBRIDGE, D et al.) 10 August 2006; Abstract, paragraph [0005], [0057], [0058], [0063]-[0065], [0072], [0074], [0100], [0103], [0119]	13, 14, and 17 ---------- 18-26
Y	US 2005/0213722 A1 (STORMON, C et al.) 29 September 2005; paragraph [0013], [0040], [0053]	13 and 14
Y	US 2004/0031015 A1 (BEN-ROMDHANE, M et al.) 12 February 2004; paragraph [0018], [0193]	14
A	US 2008/0222616 A1 (CHENG, S et al.) 11 September 2008; entire document	1-26
A	US 2010/0199263 A1 (CLEE, S et al.) 05 August 2010; entire document	1-26

☐ Further documents are listed in the continuation of Box C. ☐

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
25 September 2013 (25.09.2013)	11 OCT 2013
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Shane Thomas PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

International application No.
PCT/IL13/50338

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

Group I: Claims 1-12 and 15-17; Group II: Claims 13 and 14; Group III: Claims 18-24; Group IV: Claim 25; Group V: Claim 26

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fee must be paid.

Group I: Claims 1-12 and 15-17 are directed toward a method of converting a precompiled source code, comprising: receiving a precompiled source code of an application; providing a plurality of abstract syntax tree (AST) segment patterns each associated with another of a plurality of replacement code patterns; building an AST; matching between a first group of said plurality of AST segment patterns and a plurality of AST segments to identify a second group of said plurality of replacement code templates; performing a code migration process.

-***-Continued Within the Extra Page-***-

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

International application No.
PCT/IL13/50338

-Continued from Box No. III: Observations where unity of invention is lacking-

Group II: Claims 13 and 14 are directed toward a method of managing a system for code migration, comprising: providing a precompiled source code of an application; matching between a plurality of replacement code templates and some of a plurality of source code segments; generating a presentation of said precompiled source code; and displaying said presentation to a user.

Group III: Claims 18-24 are directed toward a method of providing one or more mapping expressions for code migration, comprising: receiving a precompiled source code of an application; generating an offer to purchase a right to use a mapping expression; generating presentation which visually associates between each of said at least some precompiled source code segments and a respective said offer; and displaying said presentation to allow a user to accept said respective offer.

Group IV: Claim 25 is directed toward a system of managing replacement code template usage, comprising: a plurality of mapping expressions each comprising an AST segment pattern associated with a replacement code template and a cost value; automatically matching between a precompiled source code and at least one respective said AST segment pattern; and generating at least one offer to purchase a right to use said at least one respective mapping expression.

Group V: Claim 26 is directed toward a system for managing a marketplace of mapping expressions, comprising: a database which stores a plurality of mapping expressions received from plurality of mapping expression solution providers, each said mapping expressions adjusted to match one of a plurality of AST segment patterns; receiving a plurality of mapping expression requests via a network, each expression indicating a precompiled source code; matching at least one matching expression; and crediting at least one of said solution providers and billing at least one requestor.

The common technical feature shared by Groups I, II, III, IV and V is converting a precompiled source code, comprising: receiving a precompiled source code of an application; providing a plurality of AST segment patterns each associated with another of a plurality of replacement code templates; building an AST of said precompiled source code; matching a first group and second group of AST segment patterns; and displaying a presentation to a user. However, this common feature is previously disclosed by US 2006/0178858 A1 (Trowbridge). Trowbridge discloses converting a precompiled source code, comprising: receiving a precompiled source code of an application (providing views of source code of a computing system; paragraph [0005]); providing a plurality of AST segment patterns each associated with another of a plurality of replacement code templates (building an abstract syntax tree (AST) that includes patterns which are matched to template patterns; paragraphs [0074] and [0100]); building an AST of said precompiled source code (building an abstract syntax tree of source code; paragraphs [0054] and [0074]); and matching a first group and second group of AST segment patterns (patterns discovered in the mapping of the computing components are matched to template pattern; paragraph [0100]); and displaying a presentation to a user (visualization of the created graphs is rendered for a user; paragraph [0103]).

Since the common technical feature is previously disclosed by the Trowbridge reference, this common feature is not special and so Groups I, II, III, IV and V lack unity.