

Search query (3): [SP]: query optimizer for cpu utilization and code refactoring methods, systems, apparatuses, and computer program products are provided for increasing an efficiency of queries in program code. a plurality of queries is detected in program code. a laziness is extended by which the queries are evaluated in the program code. the queries are decomposed into a plurality of query components. a ruleset that includes a plurality of rules is applied to the query components to generate a functionally equivalent query set to the plurality of queries that evaluates more efficiently relative to the plurality of queries.

Results: 6

1) Family number: 30846010 (US2004210882A)

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Title: PROGRAM CONVERTING APPARATUS, METHOD, AND PROGRAM

Priority: JP20020377992 20021226 US20030739730 20031218 US20070945087 20071126

Family:

Publication number	Publication date	Application number	Application date
■ CN1243306 C	20060222	CN200310120217	20031209
■ CN1512334 A	20040714	CN200310120217	20031209
■ JP2004206625 A2	20040722	JP20020377992	20021226
■ JP3956131 B2	20070808	JP20020377992	20021226
■ US2004210882 AA	20041021	US20030739730	20031218
■ US2008098372 AA	20080424	US20070945087	20071126
■ US7363621 BB	20080422	US20030739730	20031218
■ US8225299 BB	20120717	US20070945087	20071126

Probable Assignee: IBM

Assignee(s):(std): IBM ; TAKEUCHI MIKIO

Assignee(s): IBM CORP ; INT BUSINESS MACHINES CORP ; INT BUSINESS MASCHINES CORP ; INTERNATL BUSINESS MACH CORP ; INTERNATL BUSINESS MACH CORP IBM

Inventor(s):(std): TAKEUCHI MIKIO ; MIKIO TAKEUCHI

Agent(s): LOUIS P HERZBERG INTELLECTUAL PROPERTY LAW DEPT; CANTOR COLBURN LLP; YAMONACO LISA; LISA; WILLIAM J

International class (IPC 8-9): G06F9/40 G06F9/45 (Advanced/Invention); G06F9/40 G06F9/45 (Core/Invention)

International class (IPC 1-7): G06F9/45

CPC: G06F9/4484 G06F8/443 G06F8/425

European class: G06F8/443 G06F9/42 G06F9/44F1A S06F8/425

US class: 712/E09.082 712/E9.082 712/E90.82S 717/136 717/136S 717/140 717/140S 717/141 717/141P 717/142 717/142P 717/143 717/144 717/152 717/154 717/157

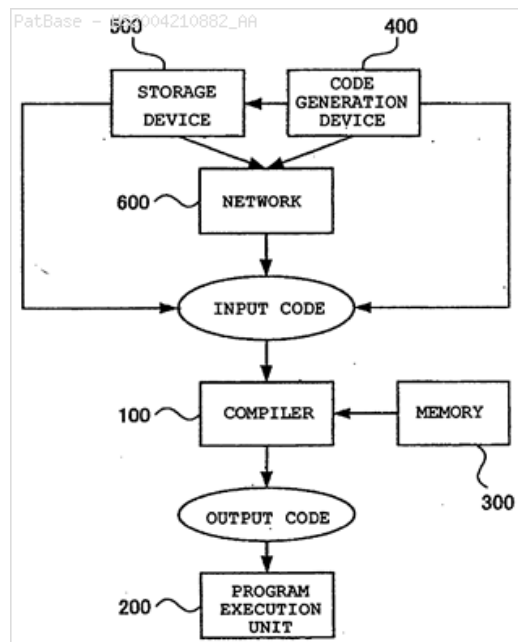
[Classification Explorer](#)

Cited documents: US7996825 BB, US7426721 BA, US7356813 BB, US7340732 BB, US7302679 BB, US7299458 BB, US7065757 BB, US6993754 BB, US6983456 BB, US6810519 BA, US6751791 BB, US6502237 BA, US6481007 BA, US6292940 BA, US6226789 BA, US6151706 A, US6091897 A, US5701489 A, US2005097533 AA, US2004019770 AA, US2004015925 AA, US2004015883 AA, US2003237079 AA, US2003154468 AA, US2003149969 AA, JP9288582, JP63163636 A2, JP63163636, JP1040106, JP10040106, JP10040106,

Forward Citations: WO17213917, US9489366, US9323507, US9043774, US8966463, US8935672, US8683451, US8572557, US8527967, US8448158, US8341613, US8302078, US8261240, US7797690, US7661098, US2013305230, US2013139136, US2011209048, US2009280158, US2009228257, US2009217248, US2009183142, US2009144709, US2008168431, US2006212862, US2005198624, US2005071831, JP5936118, JP2013222303, CN108027748, CN108027748,

Abstract:

Program converting methods, apparatus and systems including a code analysis unit for performing lexical and syntactic analyses of a source code of an execution program, an optimization unit for transforming this execution program, and an output code generation unit for converting the transformed execution program into a machine language code. In addition, this optimization unit detects a calling procedure and a called procedure in a procedure call of this execution program analyzed by the code analysis unit, guards an evaluation of an argument described in the called procedure under a predetermined evaluation condition, and transforms the execution program so that the evaluation is performed when referring to this argument.



2) Family number: 15907104 (US2007038618A)

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Title: SYSTEM AND METHOD FOR AUTOMATICALLY GENERATING DATABASE QUERIES

Priority: US20000207379P 20000526 EP20010939541 20010525 US20010865276 20010525
 WO2001US17171 20010525 US20020087890 20020228 US20020288659 20021105
 US20030626426 20030724 US20040913998 20040806 US20050129867 20050516
 US20060327945 20060109

Family:	Publication number	Publication date	Application number	Application date
	AU2001265048 AA	20011211	AU20010265048	20010525
	AU2001265048 BB	20071018	AU20010265048	20010525
	AU200165048 A1	20011211	AU20010065048	20010525
	AU200165048 A5	20011211	AU20010065048	20010525
	BRPI0111192 A	20050510	BR2001PI11192	20010525
	CA2409276 AA	20021118	CA20012409276	20010525
	CN1592905 A	20050309	CN20018011820	20010525
	DE60149116 D1	20141224	DE20016049116	20010525
	EP1350184 A2	20031008	EP20010939541	20010525
	EP1350184 B1	20141119	EP20010939541	20010525
	HK1060408 A1	20040806	HK20040102021	20040318
	HK1060408 A3	20040806	HK20040102021	20040318
	IL152987 A0	20030624	IL20010152987	20010525
	IL152987 A1	20090504	IL20010152987	20010525
	JP2004509382 T2	20040325	JP20020500250T	20010525
	KR20030047889 A	20030618	KR20027016062	20010525
	US2007038618 AA	20070215	US20060327945	20060109
	US8019750 BB	20110913	US20060327945	20060109
	WO0193105 A2	20011206	WO2001US17171	20010525
	WO0193105 A3	20030731	WO2001US17171	20010525

Probable Assignee: COMPUTER ASSOCIATES THINK INC

Assignee(s):(std): MENON SREEKUMAR ; VINCENT JOHN K ; KOSCIUSKO EDWARD ; LAU JOYCE H ; CA INC ; COMPUTER ASS THINK INC ; VO HUNG VUONG ; WERLING THOMAS K

Assignee(s): WERLING THOMAS ; COMPUTER ASSOCIATES THINK INC ; CA INC ISLANDIA ; SREEKUMAR MENON ; VINCENT JOHN ; LAU JOYCE ; COMPUTER ASSOCIATES THINK INC ONE COMPUTER ASSOCIATES PLAZA

Inventor(s):(std): EDWARD KOSCIUSKO ; HUNG VUONG VO ; KOSCIUSKO EDWARD ; JOYCE LAU ; JOHN VINCENT ; MENON SREEKUMAR ; LAU JOYCE H ; LAU JOYCE ; SREEKUMAR MENON ; VO HUNG VUONG ; WERLING THOMAS K ; VINCENT JOHN K ; WERLING THOMAS ; VINCENT JOHN ; THOMAS WERLING ; SREEKUMAR MEMON

Inventor(s): SREEKUMAR MENON PARSIPPANY ; LAU JOYCE OAKLAND ; VO HUNG VUONG ISLANDIA ; VINCENT JOHN RICHMOND ; WERLING THOMAS SAN FRANCISCO ; MEMON SREEKUMAR ; KOSCIUSKO EDWARD UPPER MONTCLAIR

Agent(s): SMOORENBURG PINI PATENT AND TRADE MARK ATTORNEYS; SMOORENBURG PATENT AND TRADE MARK ATTORNEYS; BERESKIN AND PARR; MAUCHER BOERJES JENKINS; DUNLOP HUGH CHRISTOPHER; HONG KONG PATENT REGISTRATIONS CO 4005 TOWER TWO LIPPO CENTRE 89; LUZZATTO AND LUZZATTO; BAKER BOTTS LLP

Designated states: AE AG AL AM AT AU AZ BA BB BE BF BG BJ BR BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DZ EE ES FI FR GA GB GD GE GH GM GN GR GW HR HU ID IE IL IN IS IT JP KE KG KP KR KZ LC LI LK LR LS LT LU LV MA MC MD MG MK ML MN MR MW MX MZ NE NL NO NZ PL PT RO RU SD SE SG SI SK SL SN SZ TD TG TJ TM TR TT TZ UA UG UZ VN YU ZA ZW

International class (IPC 8-9): G06F G06F17/30 G06F7/00 (Advanced/Invention); G06F17/30 (Advanced/Non-invention); G06F17/30 (Core/Invention)

International class G06F G06F17/30

(IPC 1-7):

CPC: G06F16/24534 G06F16/217
European class: G06F17/30S1T G06F17/30S4P3T
US class: 1/1 1/1P 707/4 707/718 707/999.004 707/999.004S

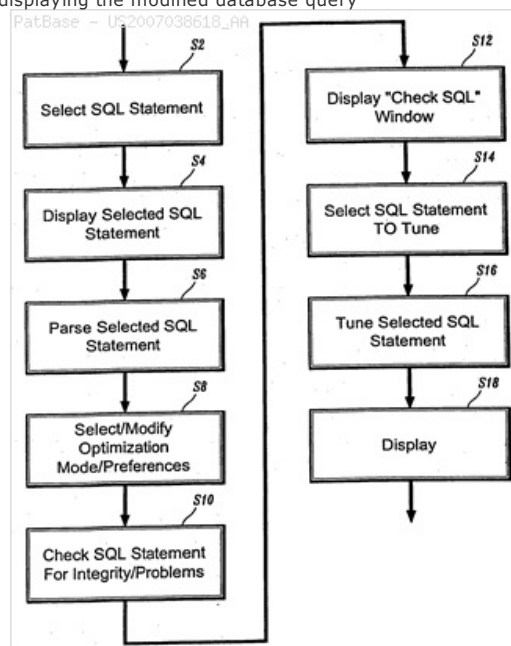
[Classification Explorer](#)

Cited documents: US6434545 BA, US6363377 BA, US6259896 BA, US6205441 BA, US6061676 A, US5956707 A, US5806062 A, US5765168 A, US5765147 A, US5761654 A, US5758145 A, US5745904 A, US5675785 A, US5666528 A, US5560007 A, US5555409 A, US5421008 A, US5404510 A, US5347653 A, US5276870 A, US2005120000 AA, US2002052893 AA,

Forward Citations: US9886481, US9781114, US9779136, US9734200, US9720941, US9589015, US9384301, US9240945, US9223827, US9189522, US9170999, US9146984, US9104784, US9058356, US9009181, US8990910, US8990573, US8983934, US8943575, US8910241, US8903801, US8903763, US8825629, US8694525, US8694524, US8555263, US8516539, US8452754, US8166009, US8150865, US8112421, US8065323, US8019771, US7882121, US7827153, US7805411, US7783656, US7774318, US7756861, US7747606, US7739263, US7734620, US7702658, US7664778, US7664730, US7634456, US7567952, US7343367, US7245080, US2017351512, US2016092508, US2015149436, US2015039555, US2014067789, US2014046927, US2012330988, US2012166447, US2012095988, US2011179404, US2010287214, US2010228764, US2010185597, US2010030756, US2009328186, US2009276204, US2009241170, US2009164445, US2009144818, US2009138939, US2009133110, US2009106306, US2009094216, US2009083239, US2009077016, US2009055432, US2008133491, US2008126393, US2008065595, US2008040334, US2008021869, US2008021868, US2007198555, US2007185851, US2007185834, US2007143246, US2006259457, US2005187917, US2005125427, US2005125393, US10394807, US10354203, US10324933, US10311105, US10296657, US10229359, US10229358, US10229158, US10210223, KR101432700, EP2020637, CN106919678, CN104881460, CN102968420,

Abstract:

A method of tuning a database query includes selecting a database query, parsing the selected database query to determine relationships between portions of the selected database query, selecting an optimization mode from a plurality of available optimization modes, tuning the selected database query by modifying, at least one portion of the selected database query based on the determined relationships and the selected optimization mode and displaying the modified database query



3) Family number: 50847240 (US2012078878A)

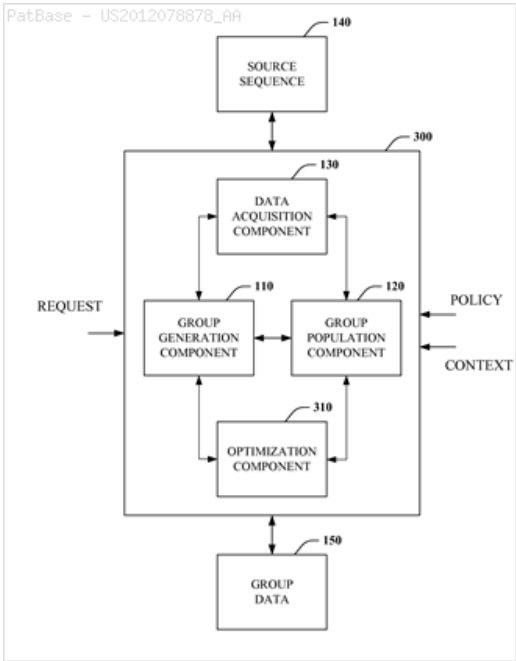
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Title: OPTIMIZED LAZY QUERY OPERATORS
Priority: US20100891951 20100928
Family:

Publication number	Publication date	Application number	Application date
US2012078878 AA	20120329	US20100891951	20100928

Probable Assignee: MICROSOFT CORP
Assignee(s):(std): DE SMET BART ; DYER JOHN WESLEY ; MEIJER HENRICUS JOHANNES MARIA ; MICROSOFT CORP ; VAN GOGH JEFFREY
Assignee(s): MICROSOFT TECHNOLOGY LICENSING LLC
Inventor(s):(std): DE SMET BART ; DYER JOHN WESLEY ; MEIJER HENRICUS JOHANNES MARIA ; VAN GOGH JEFFREY
International class (IPC 8-9): G06F17/30 (Advanced/Invention)
CPC: G06F16/24539 G06F16/2454
European class: G06F17/30S4P3T3 G06F17/30S4P3T4
US class: 707/713 707/713P 707/737 707/737S 707/769 707/769S 707/E17.017 707/E17.017S
[Classification Explorer](#)
Cited documents: US8881121 BB, US8656300 BB, US7716215 BB, US7664774 BB, US7383246 BB, US7356526 BB, US7349925 BB, US7203926 BB, US7058936 BB, US6269382 BA, US5099450 A, US2011173621 AA, US2009144229 AA, US2008133492 AA,
Forward Citations: US9606784, US9569722, US8892557, US8538963, US2017351512, US2015178382, US2012123984,
Abstract: Query operators such as those that perform grouping functionality can be implemented to execute lazily rather than eagerly. For

instance, one or more groups can be created and/or populated lazily with one or more elements from a source sequence in response to a request for a group or element of a group. Furthermore, lazy execution can be optimized as a function of context surrounding a query, among other things.



4) Family number: 67745408 (US2017351512A)

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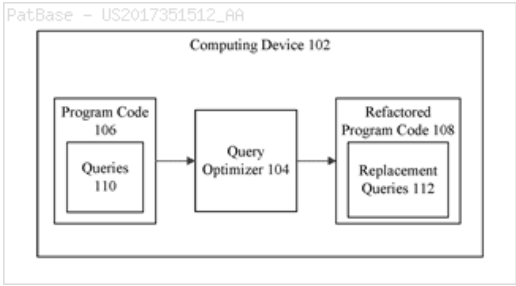
Title: QUERY OPTIMIZER FOR CPU UTILIZATION AND CODE REFACTORING
Priority: US20160174688 20160606 WO2017US35085 20170531
Family:

Publication number	Publication date	Application number	Application date
AU2017277831 AA	20181122	AU20170277831	20170531
BR112018074025 A2	20190226	BR20181174025	20170531
CA3023326 AA	20181106	CA20173023326	20170531
CL2018003468 A1	20190315	CL20180003468	20181204
CN109313547 A	20190205	CN201780035355	20170531
CO20180013186 A2	20181214	CO20180013186	20181205
EP3465425 A1	20190410	EP20170729659	20170531
ID201900783 A	20190201	ID2018P0009953	20170531
IL263264 A0	20181231	IL20170263264	20170531
IN201817045852 A	20190201	IN201817045852	20181204
JP2019523942 T2	20190829	JP20180563782T	20170531
KR20190015285 A	20190213	KR20187035332	20170531
MX2018015045 A1	20190306	MX20180015045	20170531
PH2018550197 A	20190916	PH20180550197	20181112
SG11201809886V A1	20181228	SG20181109886	20170531
US2017351512 AA	20171207	US20160174688	20160606
WO17213917 A1	20171214	WO2017US35085	20170531

Probable Assignee: MICROSOFT CORP
Assignee(s):(std): MICROSOFT CORP ; MICROSOFT TECHNOLOGY LICENSING LLC ; MICROSOFT TECH LICENSING LLC
Assignee(s): TAMIR GAL ; ELUK AMIR ; IWANIR ELAD ; KOREH ELI
Inventor(s):(std): TAMIR GAL ; ELUK AMIR ; KOREH ELI ; IWANIR ELAD ; ELAD IWANIR ; GAL TAMIR ; AMIR ELUK ; ELI KOREH
Agent(s): DAVIES COLLISON CAVE PTY LTD; SMART AND BIGGAR; ESTUDIO VILLASECA Y CIA; GRUENECKER PATENT U RECHTSANWAELTE PARTG MBB; LANNY SETIAWAN MBA MMGT MA LPC MA LMFT; ONO SHINJIRO; YAMAMOTO OSAMU; MIYAMAE TORU; NAKANISHI MOTOHARU; MINHAS SANDIP ET AL
Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DJ DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KH KM KN KP KR KW KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW
International class (IPC 8-9): G06F G06F16/2453 G06F16/335 G06F17/30 G06F8/72 G06F9/44 (Advanced/Invention); G06F (Subclass/Invention)
International class (IPC 1-7): G06F9/44
CPC: G06F8/72 G06F16/24534
US class: 1/1 717/110
[Classification Explorer](#)
Cited documents: US2016098448 AA, US2012078878 AA, US2011314000 AA, US2007038618 AA, US2004210882 AA,

Abstract: Methods, systems, apparatuses, and computer program products are provided for increasing an efficiency of queries in program code. A plurality of queries is detected in program code. A laziness is extended by which the queries are evaluated in the program code. The queries are decomposed into a plurality of query components. A ruleset that includes a plurality of rules is applied to the query components to generate a functionally equivalent query set to the plurality of queries that evaluates more

efficiently relative to the plurality of queries.



5) Family number: 62056868 (US2016098448A) © PatBase

Title:

Priority:

Family:

Probable Assignee:

Assignee(s):(std):

Inventor(s):(std):

Agent(s):

Designated states:

International class

IPC 8-9):

CPC:

US class:

Classification Explorer

Cited documents:

Forward Citations:

DYNAMIC DATABASE QUERY EFFICIENCY IMPROVEMENT

US20140507562 20141006

EP20140004375 20141222

Publication number	Publication date	Application number	Application date
DE602014015562 D1	20171123	DE201460015562T	20141222
EP3007079 A1	20160413	EP20140004375	20141222
EP3007079 B1	20171011	EP20140004375	20141222
US2016098448 AA	20160407	US20140507562	20141006

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AL AT BA BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL NO PL PT RO RS SE SI SK SM TR

G06F17/27 G06F17/30 (Advanced/Invention)

G06F17/2705 G06F16/24534

707/713

Classification Explorer

Cited documents:

Forward Citations:

DYNAMIC DATABASE QUERY EFFICIENCY IMPROVEMENT

US20140507562 20141006

EP20140004375 20141222

Publication number	Publication date	Application number	Application date
DE602014015562 D1	20171123	DE201460015562T	20141222
EP3007079 A1	20160413	EP20140004375	20141222
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US2016098448 AA	20160407	US20140507562	20141006

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AL AT BA BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL NO PL PT RO RS SE SI SK SM TR

G06F17/27 G06F17/30 (Advanced/Invention)

G06F17/2705 G06F16/24534

707/713

Classification Explorer

Cited documents:

Forward Citations:

DYNAMIC DATABASE QUERY EFFICIENCY IMPROVEMENT

US20140507562 20141006

EP20140004375 20141222

Publication number	Publication date	Application number	Application date
DE602014015562 D1	20171123	DE201460015562T	20141222
EP3007079 A1	20160413	EP20140004375	20141222
EP3007079 B1	20171011	EP20140004375	20141222
US2016098448 AA	20160407	US20140507562	20141006

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MUELLER BORE AND PARTNER PATENTANWALTE PARTG MBB; MUELLER BORE AND PARTNER PATENTANWALTE PARTG MBB

AL AT BA BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL NO PL PT RO RS SE SI SK SM TR

G06F17/27 G06F17/30 (Advanced/Invention)

G06F17/2705 G06F16/24534

707/713

Classification Explorer

Cited documents:

Forward Citations:

DYNAMIC DATABASE QUERY EFFICIENCY IMPROVEMENT

US20140507562 20141006

EP20140004375 20141222

Publication number	Publication date	Application number	Application date
DE602014015562 D1	20171123	DE201460015562T	20141222
EP3007079 A1	20160413	EP20140004375	20141222
EP3007079 B1	20171011	EP20140004375	20141222
US2016098448 AA	20160407	US20140507562	20141006

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MUELLER BORE AND PARTNER PATENTANWALTE PARTG MBB; MUELLER BORE AND PARTNER PATENTANWALTE PARTG MBB

AL AT BA BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL NO PL PT RO RS SE SI SK SM TR

G06F17/27 G06F17/30 (Advanced/Invention)

G06F17/2705 G06F16/24534

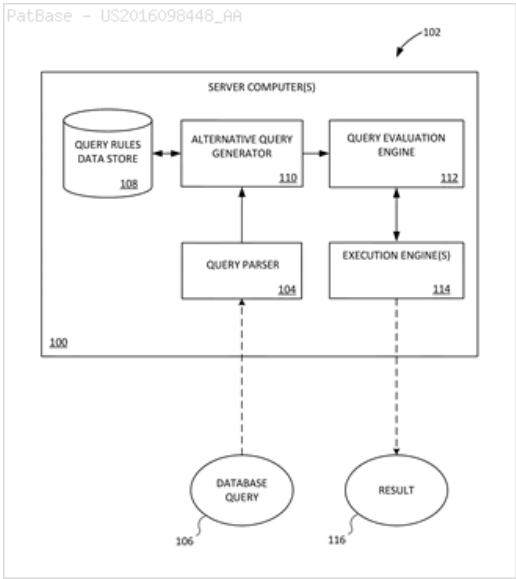
707/713

Classification Explorer

Cited documents:

Forward Citations:

Abstract:
Examples of dynamic database query efficiency improvement are provided herein. Query portions of a received database query can be identified as candidates for replacement. The candidates for replacement can be query portions that reduce the efficiency of the query. Alternative queries can be determined that include substitute query portion(s) in place of candidate(s) for replacement. An expected performance of the alternative queries can be determined. Based at least in part on the expected performance of the alternative queries, one or more alternative queries can be selected as replacement database queries for the received database query.



6) Family number: 50247990 (US2011314000A) © PatBase

Title: TRANSFORMATION RULE PROFILING FOR A QUERY OPTIMIZER

Priority: US20100818237 20100618

Family:

Publication number	Publication date	Application number	Application date
US2011314000 AA	20111222	US20100818237	20100618
US8332388 BB	20121211	US20100818237	20100618

Probable Assignee: MICROSOFT CORP

Assignee(s):(std): CHAUDHURI SURAJIT ; GIAKOU MAKIS LEO ; MICROSOFT CORP ; NARASAYYA VIVEK ; RAMAMURTHY RAVI

Assignee(s): MICROSOFT TECHNOLOGY LICENSING LLC

Inventor(s):(std): CHAUDHURI SURAJIT ; GIAKOU MAKIS LEO ; NARASAYYA VIVEK ; RAMAMURTHY RAVI

Agent(s): POWELL IP LAW PLLC; TRACY

International class (IPC 8-9): G06F17/30 G06F7/00 (Advanced/Invention)

CPC: G06F16/24542

European class: G06F17/30S4P3T5

US class: 707/718 707/718P 707/765 707/E17.131 707/E17.131S

[Classification Explorer](#)

Cited documents: US7194452 BB, US7194451 BB, US6957211 BA, US6615203 BA, US6356889 BA, US6289334 BA, US6240406 BA, US5822747 A, US5819255 A, US5544355 A, US2010030758 AA, US2008195578 AA, US2007179941 AA, US2007055362 AA, US2006253422 AA, US2006248045 AA, US2006230017 AA, US2005210023 AA, US2005198016 AA, US2005187917 AA, US2005154757 AA, US2005050041 AA, US2003172059 AA, US2003093415 AA, US2003009450 AA,

Forward Citations: WO16167824, WO15080802, US9965547, US9892159, US9779180, US9367594, US9336272, US9298671, US9043248, US8635206, US2017351512, US2017083828, US2017083575, US2016275159, US2016275099, US2016117417, US2015324469, US2015149441, US2014280035, US2013262351, US2013262350, US10311055, US10255324, US10216819, US10210233, US10152510, US10152509, US10083208,

Abstract:
 Technology is described for transformation rule profiling for a query optimizer. The method can include obtaining a database query configured to be optimized by the query optimizer of a database system. An optimized query plan for the database query can be found using a host set of transformation rules. One transformation rule can be removed and checked at a time. Each transformation rule can be checked to determine whether the transformation rule affects an optimal query plan output. A test query plan can be generated after each transformation rule has been removed. The query optimizer can determine whether the test query plan is different than the optimized query plan in the absence of the removed transformation rule. An equivalent set of transformation rules can be created that includes transformation rules where the test query plan generated from the equivalent set of transformation rules is equivalent to the optimized plan.

