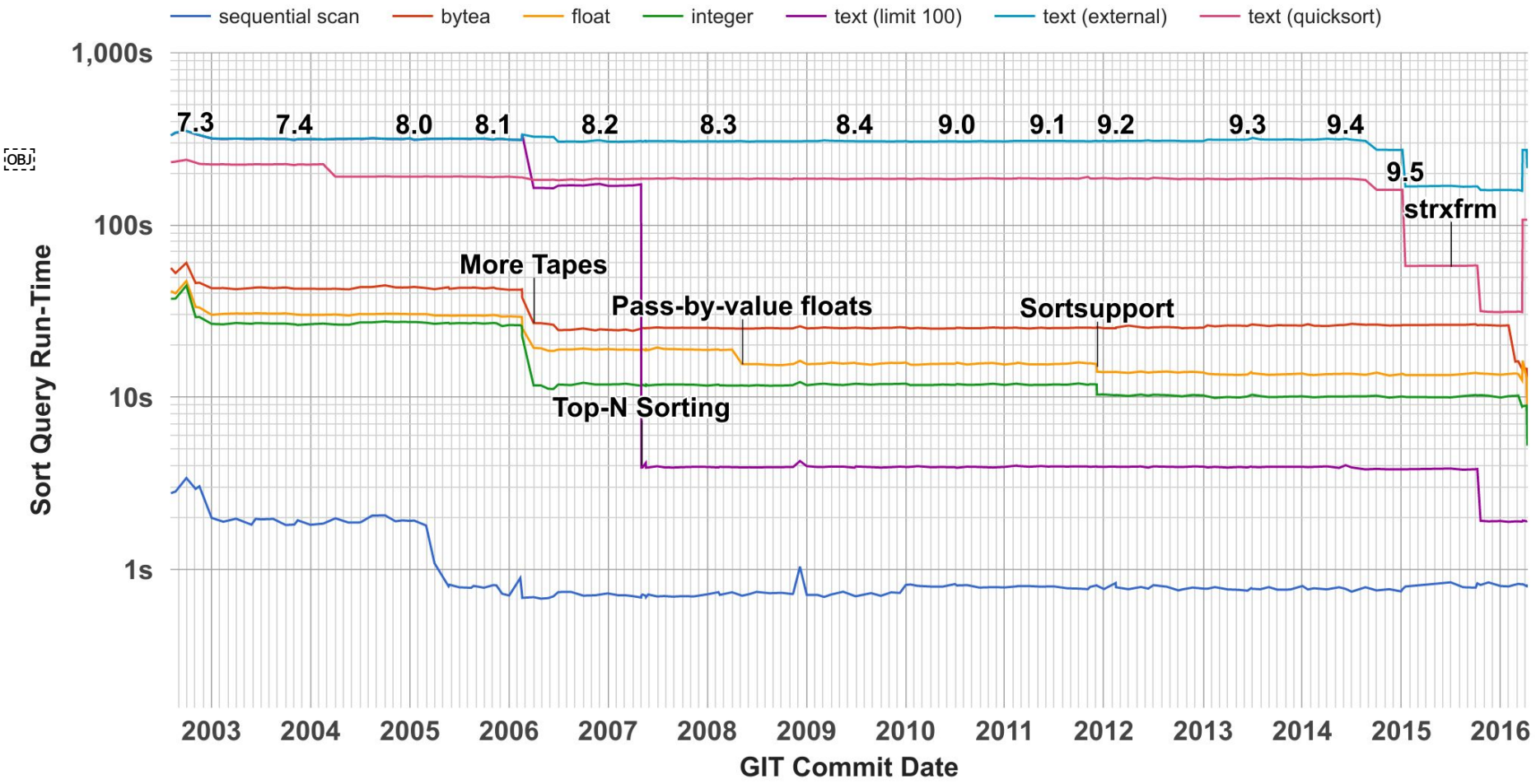
A look at the elephant's tail….

Sorting Through The Ages



Release Date	Test Name	Time (ms)	Release Tag	Release Tag Containing	Release Timestamp
2001-05-05	seqscan_x8	2603.34	REL7_1_3	REL7_1_3	2001-05-05T02:57:40
2001-05-05	sort_text_x8	542585.4	REL7_1_3	REL7_1_3	2001-05-05T02:57:40
2001-05-05	sort_integer_x8	43596.1	REL7_1_3	REL7_1_3	2001-05-05T02:57:40
2001-05-05	sort_float_x8	48976.08	REL7_1_3	REL7_1_3	2001-05-05T02:57:40
2001-05-05	sort_text_x8	534746.38	REL7_1_3	REL7_1_3	2001-05-05T02:57:40
2001-05-05	sort_integer_x8	43805.21	REL7_1_3	REL7_1_3	2001-05-05T02:57:40
2001-08-31	seqscan_x8	2635.24	REL7_2~1415	REL7_2~1415	2001-08-31T01:55:25
2001-08-31	seqscan_x8	2627.86	REL7_2~1415	REL7_2~1415	2001-08-31T01:55:25
2001-08-31	seqscan_x8	2620.78	REL7_2~1415	REL7_2~1415	2001-08-31T01:55:25
2001-08-31	seqscan_x8	2625.41	REL7_2~1415	REL7_2~1415	2001-08-31T01:55:25
2001-08-31	sort_text_x8	343644.71	REL7_2~1415	REL7_2~1415	2001-08-31T01:55:25
2001-08-31	sort_binary_x8	58135.68	REL7_2~1415	REL7_2~1415	2001-08-31T01:55:25
2001-08-31	seqscan_x8_lowmem2	7200.67	REL7_2~1415	REL7_2~1415	2001-08-31T01:55:25
2001-08-31	sort_text_x8_lowmem2	445258.37	REL7_2~1415	REL7_2~1415	2001-08-31T01:55:25
2001-08-31	sort_text_x8_lowmem2	436544.71	REL7_2~1415	REL7_2~1415	2001-08-31T01:55:25
2001-10-02	seqscan_x8	2762.95	REL7_2~1060	REL7_2~1060	2001-10-02T14:21:26
2001-10-02	seqscan_x8	2762.74	REL7_2~1060	REL7_2~1060	2001-10-02T14:21:26
2001-10-02	sort_text_x8	343262.2	REL7_2~1060	REL7_2~1060	2001-10-02T14:21:26
2001-10-02	sort_binary_x8	58514.77	REL7_2~1060	REL7_2~1060	2001-10-02T14:21:26
2001-10-02	sort_integer_x8	39999.78	REL7_2~1060	REL7_2~1060	2001-10-02T14:21:26
2001-10-02	sort_float_x8	41129.5	REL7_2~1060	REL7_2~1060	2001-10-02T14:21:26
2001-11-14	seqscan_x8	2709.66	REL7_2~643	REL7_2~643	2001-11-14T22:14:22
2001-11-14	sort_text_x8	341377.84	REL7_2~643	REL7_2~643	2001-11-14T22:14:22
2001-11-14	sort_binary_x8	58171.82	REL7_2~643	REL7_2~643	2001-11-14T22:14:22
2001-11-14	sort_integer_x8	40271.03	REL7_2~643	REL7_2~643	2001-11-14T22:14:22
2001-11-14	sort_float_x8	40663.84	REL7_2~643	REL7_2~643	2001-11-14T22:14:22

All else being equal….

- Same tools
- Same build options (-O2 -fno-strict-aliasing -fwrapv -fexcess-precision=standard etc.)
- Same work_mem
- Same encoding and collation locale (Unicode and uk_UA)
- Same data (200MB Ukrainian wordlist)

```
#!/bin/sh

VERS_RELEASES="REL7_1_3 REL7_2_8 REL7_3_21 REL7_4_30 REL8_0_26 REL8_1_23 REL8_2_23 REL8_3_23 REL8_4_22 REL9_0_23 REL9_1_19 REL9_2_14 REL9_3_10 REL9_4_5 REL9_5_0"

VERS_SLIDES="REL8_2_0~1764 REL8_3_0~1344 REL8_3_0~1416 REL9_2_0~1071 REL9_3_0~735 REL9_4_0~1923 REL9_5_ALPHA1-1556-g80cf189 REL9_5_ALPHA1-1361-g3df9c37 REL9_5_ALPHA1-586-g5be94a9"

VERS_QUARTERS="REL7_2~1060 REL7_2~226 REL7_3~1793 REL7_3~1268 REL7_3~366 REL7_4~2136 REL7_4~1629 REL7_4~1073 REL7_4~350 REL8_0_0~2683 REL8_0_0~2132 REL8_0_0~1539 REL8_0_0~839 REL8_0_0~130
REL8_1_0~1542 REL8_1_0~884 REL8_1_0~247 REL8_2_0~2042 REL8_2_0~1581 REL8_2_0~1012 REL8_2_0~332 REL8_3_0~2316 REL8_3_0~1603 REL8_3_0~1189 REL8_3_0~732 REL8_3_0~119 REL8_4_0~1907 REL8_4_0~1498
REL8_4_0~1218 REL8_4_0~775 REL8_4_0~360 REL9_0_0~1855 REL9_0_0~1454 REL9_0_0~1249 REL9_0_0~627 REL9_0_0~202 REL9_1_0~1695 REL9_1_0~1328 REL9_1_0~628 REL9_2_0~1825 REL9_2_0~1396 REL9_2_0~984
REL9_2_0~551 REL9_3_0~1509 REL9_3_0~1099 REL9_3_0~789 REL9_3_0~390 REL9_4_0~1894 REL9_4_0~1617 REL9_4_0~1246 REL9_4_0~744 REL9_5_0~2370 REL9_5_0~1996 REL9_5_0~1569 REL9_5_ALPHA1-20-g7b156c1
REL9_5_ALPHA1-489-ge06b2e1 REL9_5_ALPHA1-844-gdfcd9cb REL9_5_ALPHA1-972-g7dc09c1"

VERS="${VERS_SLIDES} ${VERS_RELEASES} ${VERS_QUARTERS}"
RVERS="$(for v in $VERS ; do echo "$v" ; done | sort -R)"

for ver in $RVERS; do
    describe="$(git describe --tags  --candidates=0 "$ver" 2>/dev/null || git describe --tags  --contains --match REL[0-9]_[0-9] "$ver" 2>/dev/null || git describe --tags  --contains --match
REL[0-9]_[0-9]_0 "$ver" 2>/dev/null || git describe --tags "$ver" 2>/dev/null)"
    gitdate="$(git log -n 1 --date=short "$ver"  | awk '/^Date:/{print $2}')"
    prefix="/usr/local/oldpgsql/$gitdate-$describe"

    echo "Cleaning source tree using git reset and git clean"
    git reset --hard >/dev/null
    git clean -x -d -f -q  >/dev/null

    echo "Checking out $ver"
    git checkout "$ver"  >/dev/null

    export CFLAGS='-fno-aggressive-loop-optimizations -fno-strict-aliasing -fwrapv -fexcess-precision=standard -g -D_GNU_SOURCE -Wall -Wno-address -Wno-unused-but-set-variable -Wno-pointer-sign
-Wno-format'
    export YFLAGS='-Wnone'
```

```
if [ -f ./configure ] ; then
    echo "Configuring $ver to install into $prefix"

    patch  -p1 < $OLDFIXES/flex-autoconf-fix.diff >>$logfile 2>&1
    patch  -p1 < $OLDFIXES/fix_configure_cc_version.diff >>$logfile 2>&1
    patch  -p1 < $OLDFIXES/fix-sysvshmem-cast.diff >>$logfile 2>&1


    configureargs="--prefix=$prefix"
    if ./configure --help | grep -q host=HOST ; then
        configureargs="$configureargs --host=i386-linux"
    fi
    if ./configure --help | grep -q locale ; then
        configureargs="$configureargs --enable-locale"
    fi
    if ./configure --help | grep -q multibyte ; then
        configureargs="$configureargs --enable-multibyte"
    fi
    echo "Running ./configure $configureargs"
    ./configure $configureargs >>$logfile 2>&1
    if [ $? -ne 0 ]; then
        echo "configure failed -- skipping $ver"
        continue
    fi

    if grep -q 's%@CFLAGS@%-O2%g' config.status; then
        echo "Hacking and rerunning config.status"
        sed "/CFLAGS/s/-O2/$CFLAGS/" config.status > config.status.hacked
        bash ./config.status.hacked  >>$logfile 2>&1
    elif grep -q 's%@CFLAGS@%-O2 -Wall -Wmissing-prototypes -Wmissing-declarations%g' config.status; then
        echo "Hacking and rerunning config.status"
        sed "/CFLAGS/s/-O2 -Wall -Wmissing-prototypes -Wmissing-declarations/$CFLAGS/" config.status > config.status.hacked
        bash ./config.status.hacked  >>$logfile 2>&1
    fi
```

```
elif [ -f src/configure ] ; then
    echo "Using old-style configuration approach for release <= 7.0"
    echo "Configuring $ver to install into $prefix"
    patch  -f -p1 < $OLDFIXES/70-fixes2.diff  >>$logfile 2>&1
    patch  -f -p1 < $OLDFIXES/653-fixes.diff  >>$logfile 2>&1
    patch  -f -p1 < $OLDFIXES/63-fixes.diff  >>$logfile 2>&1
    patch  -f -p1 < $OLDFIXES/62-fixes.diff  >>$logfile 2>&1
    patch  -f -p1 < $OLDFIXES/61-fixes.diff  >>$logfile 2>&1
    patch  -f -p1 < $OLDFIXES/fix-genbki-stray-backslash.diff >>$logfile 2>&1
    patch  -f -p1 < $OLDFIXES/fix-stray-default.diff  >>$logfile 2>&1

    if ./configure --host=i386-pc-linux-gnu  --with-template=list | grep -q linux-elf ; then
        template=linux-elf
    elif ./configure --host=i386-pc-linux-gnu  --with-template=list | grep -q linux_i386 ; then
        template=linux_i386
    fi

    PATH=.:$PATH ./configure --without-CXX --host=i386-linux  --with-template=$template --enable-locale --enable-multibyte --prefix="$prefix"  >>$logfile 2>&1 < /dev/null
    if [[ -f config.status ]] ; then
        echo "replacing CFLAGS and YFLAGS"
        sed "/CFLAGS/s/-O2/$CFLAGS/;/YFLAGS/s/-y/$YFLAGS/" config.status > config.status.hacked
        echo "Rerunning config.status"
        bash ./config.status.hacked  >>$logfile 2>&1
    fi
```

```
# https://access.redhat.com/solutions/37218
patch  -f -p1 < $OLDFIXES/linux-system-returns-echild.diff >>$logfile 2>&1
patch  -f -p1 < $OLDFIXES/excise-va_args-in-makelist.diff >>$logfile 2>&1
patch  -f -p1 < $OLDFIXES/excise-va_args-in-makelist-2.diff >>$logfile 2>&1
patch  -f -p1 < $OLDFIXES/fix-perl-configure-test.diff >>$logfile 2>&1
patch  -f -p1 < $OLDFIXES/fix-ecpg-missing-semicolon.diff >>$logfile 2>&1
patch  -f -p1 < $OLDFIXES/fix-ecpg-descriptors.diff >>$logfile 2>&1
patch -F1  -f -p1 < $OLDFIXES/fix-ecpg-strndup.diff >>$logfile 2>&1
patch  -f -p1 < $OLDFIXES/fix-ecpg-daytab.diff  >>$logfile 2>&1
patch  -f -p1 < $OLDFIXES/fix-datetime-datetktbl.diff  >>$logfile 2>&1
patch  -f -p1 < $OLDFIXES/fix-stray-default.diff  >>$logfile 2>&1
patch  -f -p1 < $OLDFIXES/fix-genbki-ame.diff  >>$logfile 2>&1
patch  -f -p1 < $OLDFIXES/fix-x86_64.diff   >>$logfile 2>&1
patch  -f -p1 < $OLDFIXES/yyleng-fix.diff   >>$logfile 2>&1
patch  -f -p1 < $OLDFIXES/fix-readline2.diff   >>$logfile 2>&1
patch  -f -p1 < $OLDFIXES/fix_ecpg_bison_yyerror.diff   >>$logfile 2>&1
patch  -f -p1 < $OLDFIXES/fix-postgres-h-extern-errno.diff   >>$logfile 2>&1
patch  -f -p1 < $OLDFIXES/fix-postgres-h-extern-errno2.diff   >>$logfile 2>&1
patch  -f -p1 < $OLDFIXES/fix-postgres-h-extern-errno3.diff   >>$logfile 2>&1
patch  -f -p1 < $OLDFIXES/fix-plpgsql-bison.diff   >>$logfile 2>&1
patch  -f -p1 < $OLDFIXES/fix-bison-base_yyscan_t-ordering.diff   >>$logfile 2>&1
```

The world didn’t stand still for 20 years

- Gcc changed (new optimizations, new warnings -- even new syntax errors)
- Bison changed
- Perl 5.10 < 5.3 ?!
- Even sed changed !
- Readline changed
- Libc changed
  - Threads (errno is a thread-local variable now)
  - system(3) returns ECHILD if you set SIGCHILD handler
  - strndup is now in libc
  - va_args failed
- 64-bit CPUs became commonplace

Engineering Instincts Proven

Many cases where changes were made to “future-proof” code or reduce maintenance burden

- ECPG parser is now generated from main parser rather than separately maintained. Nearly every version prior to this commit required adjustment due to small errors bison is pickier about today. These represent bugs that were present in these old versions that we never learned about!
- Commit eliminating varargs usage as unnecessary complexity and overhead needed to be backpatched to compile on modern compilers. At the time it was removed there was no problem at all with the code.
- Eliminating use of system(3) in initdb to perform “cp -r” in favour of C code implementing the same functionality -- largely justified at the time as being able to implement better error handling -- in fact avoided a major glibc behaviour change much later that caused system(3) to return inexplicable ECHILD errors (which interestingly is a behaviour Solaris also had).

Release Process was… a bit more relaxed

- Many fixes were not backpatched
- No talk of distributions
- No build farm reports

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Unknown Type 'ame' [urgent]

From: "Mike Miller" <temp6453(at)hotmail(dot)com>
To: pgsql-general(at)postgresql(dot)org
Subject: Unknown Type 'ame' [urgent]
Date: 2001-01-16 18:10:00
Message-ID: F173jyWj0No5RXQjOxy00017683@hotmail.com (view raw or whole thread)
Thread: 2001-01-16 18:10:00 from "Mike Miller" <temp6453(at)hotmail(dot)com>
Lists: pgsql-general

```
I was having problems with AME in 7.0.3 running initdb so I figured I would
try to install 7.1beta3 and see if it is fixed.  I get the following error:
"ERROR:  Error: unknown type 'ame'." still with this version.  Clearly
something is wrong.  Does anyone have any ideas?

--
Mike

[postgres pgsql]$ /usr/pgsql/bin/initdb -D /usr/pgsql/data
This database system will be initialized with username "postgres".
This user will own all the data files and must also own the server process.

Fixing permissions on existing directory /usr/pgsql/data
Creating directory /usr/pgsql/data/base
Creating directory /usr/pgsql/data/global
Creating directory /usr/pgsql/data/pg_xlog
Creating template1 database in /usr/pgsql/data/base/1
DEBUG:  starting up
DEBUG:  database system was shut down at 2001-01-16 13:06:34
DEBUG:  CheckPoint record at (0, 8)
DEBUG:  Redo record at (0, 8); Undo record at (0, 8); Shutdown TRUE
DEBUG:  NextTransactionId: 514; NextOid: 16384
DEBUG:  database system is in production state
ERROR:  Error: unknown type 'ame'.

Creating global relations in /usr/pgsql/data/global
DEBUG:  starting up
DEBUG:  database system was interrupted at 2001-01-16 13:06:34
DEBUG:  CheckPoint record at (0, 8)
DEBUG:  Redo record at (0, 8); Undo record at (0, 8); Shutdown TRUE
DEBUG:  NextTransactionId: 514; NextOid: 16384
DEBUG:  database system was not properly shut down; automatic recovery in
progress...
FATAL 2:  cannot open pg_log: No such file or directory

initdb failed.
Removing temp file /tmp/initdb.29632.
```

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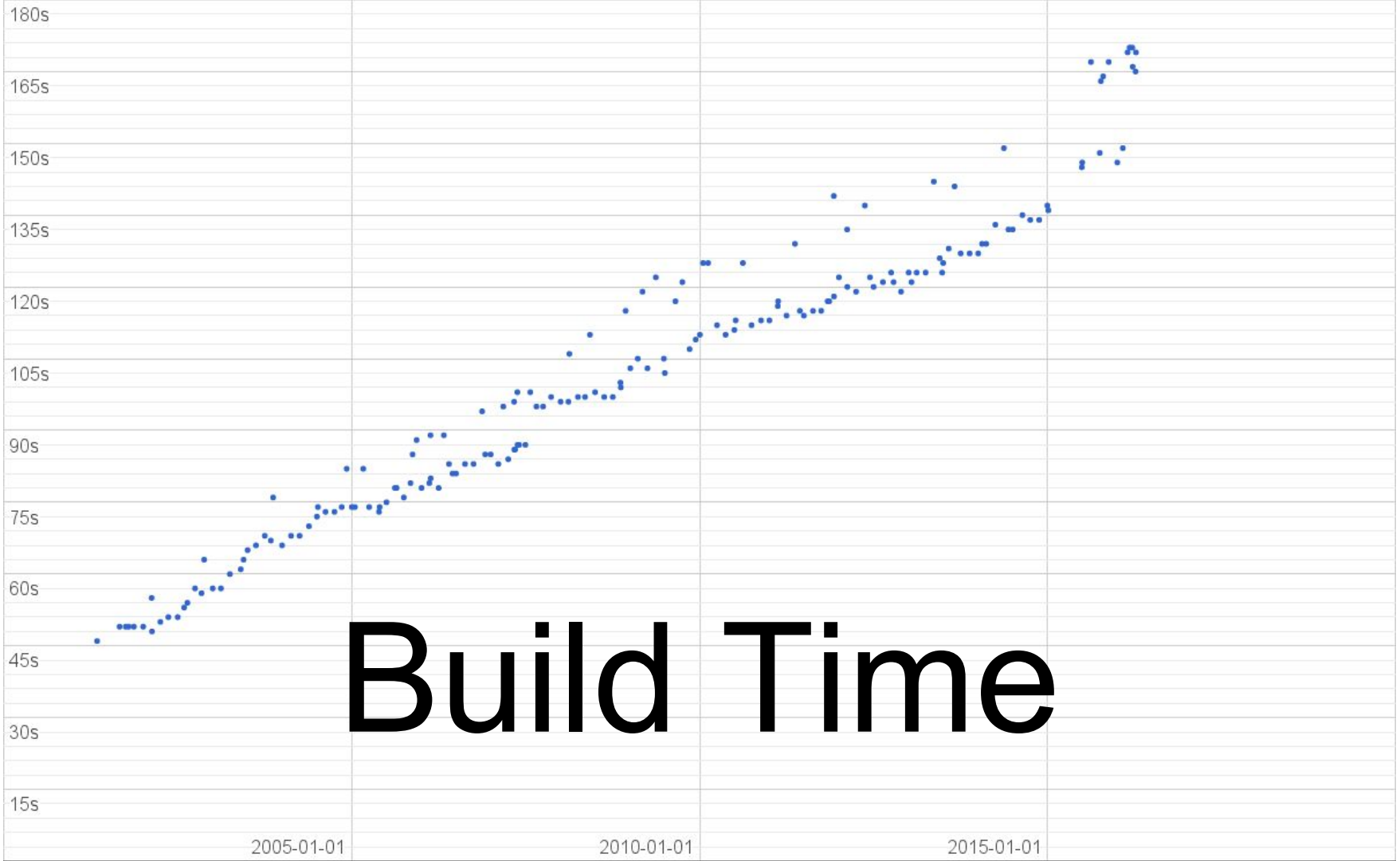
Re: Re: Unknown Type 'ame' [urgent]

From: Tom Lane <tgl(at)sss(dot)pgh(dot)pa(dot)us>
To: Bruce Momjian <pgman(at)candle(dot)pha(dot)pa(dot)us>
Cc: Fred Yankowski <fred(at)ontosys(dot)com>, Mike Miller <temp6453(at)hotmail(dot)com>, pgsql-general(at)postgresql(dot)org
Subject: Re: Re: Unknown Type 'ame' [urgent]
Date: 2001-01-16 23:28:56
Message-ID: 14813.979687736@sss.pgh.pa.us (view raw or whole thread)
Thread: 2001-01-16 23:28:56 from Tom Lane <tgl(at)sss(dot)pgh(dot)pa(dot)us>
Lists: pgsql-general

```
Bruce Momjian <pgman(at)candle(dot)pha(dot)pa(dot)us> writes:
>> -e "s/[      ]NameData/\ name/g" \
>> -e "s/^NameData/\name/g" \

> What is that \n doing in there?  It is certainly wrong.  I am just
> wondering what is should be.

It's been like that since 1996, according to the CVS logs.  I'm
surprised we have not had more reports of trouble --- either the shell
or sed might be deciding to translate that \n to a newline, although
evidently the consensus behavior is not to.

I zapped the gratuitous backslashes before the spaces, too, just
for luck.

                        regards, tom lane
```

```
$ ls -l old-postgres-fixes/
total 256
-rw-r--r-- 1 stark stark  9595 Feb 25 13:23 61-fixes.diff
-rw-r--r-- 1 stark stark  4045 Feb 25 13:23 62-fixes.diff
-rw-r--r-- 1 stark stark  6111 Feb 25 13:23 63-fixes.diff
-rw-r--r-- 1 stark stark  5224 Feb 25 13:23 653-fixes.diff
-rw-r--r-- 1 stark stark   379 Feb 25 13:23 70-fixes-config_status.diff
-rw-r--r-- 1 stark stark  4596 Feb 25 13:23 70-fixes.diff
-rw-r--r-- 1 stark stark  4889 Feb 25 13:23 70-fixes2.diff
-rw-r--r-- 1 stark stark   345 Feb 25 13:23 add-x86_64.diff
-rw-r--r-- 1 stark stark 16710 Feb 25 19:04 backpatch-bytea-btree-opclass.diff
-rw-r--r-- 1 stark stark   545 Feb 25 13:23 cherrypicked-missing-limits_h.diff
-rw-r--r-- 1 stark stark  2240 Feb 25 19:04 excise-va_args-in-makelist-2.diff
-rw-r--r-- 1 stark stark  7560 Feb 25 13:23 excise-va_args-in-makelist.diff
-rw-r--r-- 1 stark stark   718 Feb 27 20:15 fix-bison-base_yyscan_t-ordering.diff
-rw-r--r-- 1 stark stark   611 Feb 25 13:23 fix-datetime-datetktbl.diff
-rw-r--r-- 1 stark stark   924 Feb 25 13:23 fix-ecpg-daytab.diff
-rw-r--r-- 1 stark stark   453 Feb 25 13:23 fix-ecpg-descriptors.diff
-rw-r--r-- 1 stark stark  1761 Feb 25 13:23 fix-ecpg-duplicates-.diff
-rw-r--r-- 1 stark stark 13320 Feb 25 13:23 fix-ecpg-duplicates.diff
-rw-r--r-- 1 stark stark   878 Feb 25 16:35 fix-ecpg-missing-semicolon.diff
-rw-r--r-- 1 stark stark  1127 Feb 25 13:23 fix-ecpg-strndup.diff
-rw-r--r-- 1 stark stark   499 Feb 25 13:23 fix-ecpgyyleng-too.diff
-rw-r--r-- 1 stark stark   958 Feb 25 13:23 fix-genbki-ame.diff
-rw-r--r-- 1 stark stark   484 Feb 25 13:23 fix-genbki-stray-backslash.diff
-rw-r--r-- 1 stark stark   541 Feb 25 19:04 fix-perl-configure-test.diff
-rw-r--r-- 1 stark stark   501 Feb 25 13:23 fix-plpgsql-bison.diff
-rw-r--r-- 1 stark stark  1315 Feb 25 13:23 fix-postgres-h-extern-errno.diff
-rw-r--r-- 1 stark stark   663 Feb 25 13:23 fix-postgres-h-extern-errno2.diff
-rw-r--r-- 1 stark stark  1768 Feb 25 13:23 fix-postgres-h-extern-errno3.diff
-rw-r--r-- 1 stark stark   444 Feb 25 13:23 fix-readline.diff
-rw-r--r-- 1 stark stark  1764 Feb 25 13:23 fix-readline2.diff
-rw-r--r-- 1 stark stark   379 Feb 25 13:23 fix-stray-default.diff
-rw-r--r-- 1 stark stark  1041 Feb 25 13:23 fix-sysvshmem-cast.diff
-rw-r--r-- 1 stark stark  1788 Feb 25 13:23 fix-x86_64.diff
-rw-r--r-- 1 stark stark   302 Feb 25 13:23 fix_configure_cc_version.diff
-rw-r--r-- 1 stark stark   321 Feb 25 13:23 fix_ecpg_bison_yyerror.diff
-rw-r--r-- 1 stark stark   506 Feb 25 13:23 flex-autoconf-fix.diff
-rw-r--r-- 1 stark stark   918 Feb 25 13:23 linux-system-returns-echild.diff
-rw-r--r-- 1 stark stark 48112 Feb 25 13:23 postgresql-6.5.2-alpha.patch
-rw-r--r-- 1 stark stark  1728 Feb 25 13:23 yyleng-fix.diff
```


180s
165s
150s
135s
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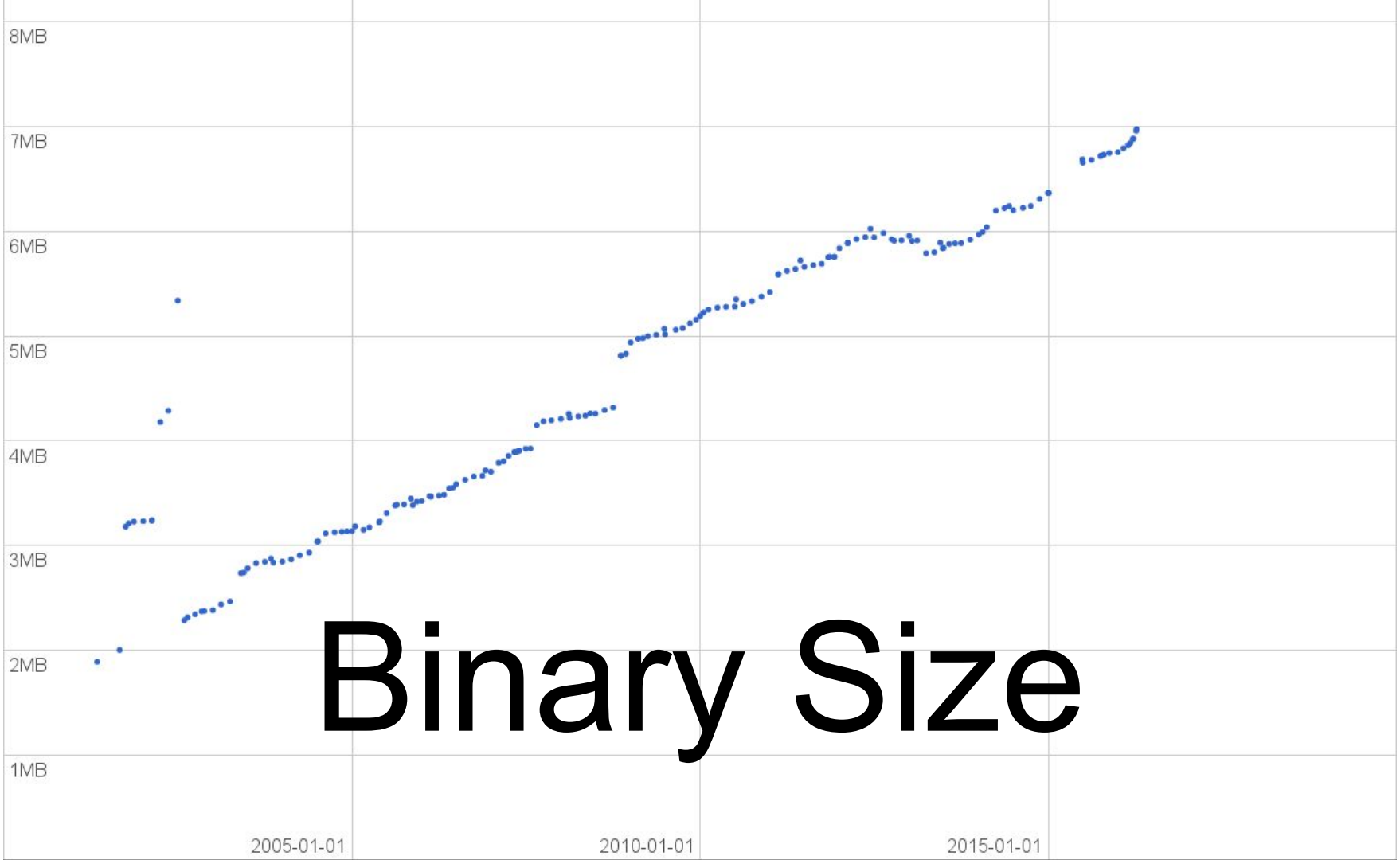
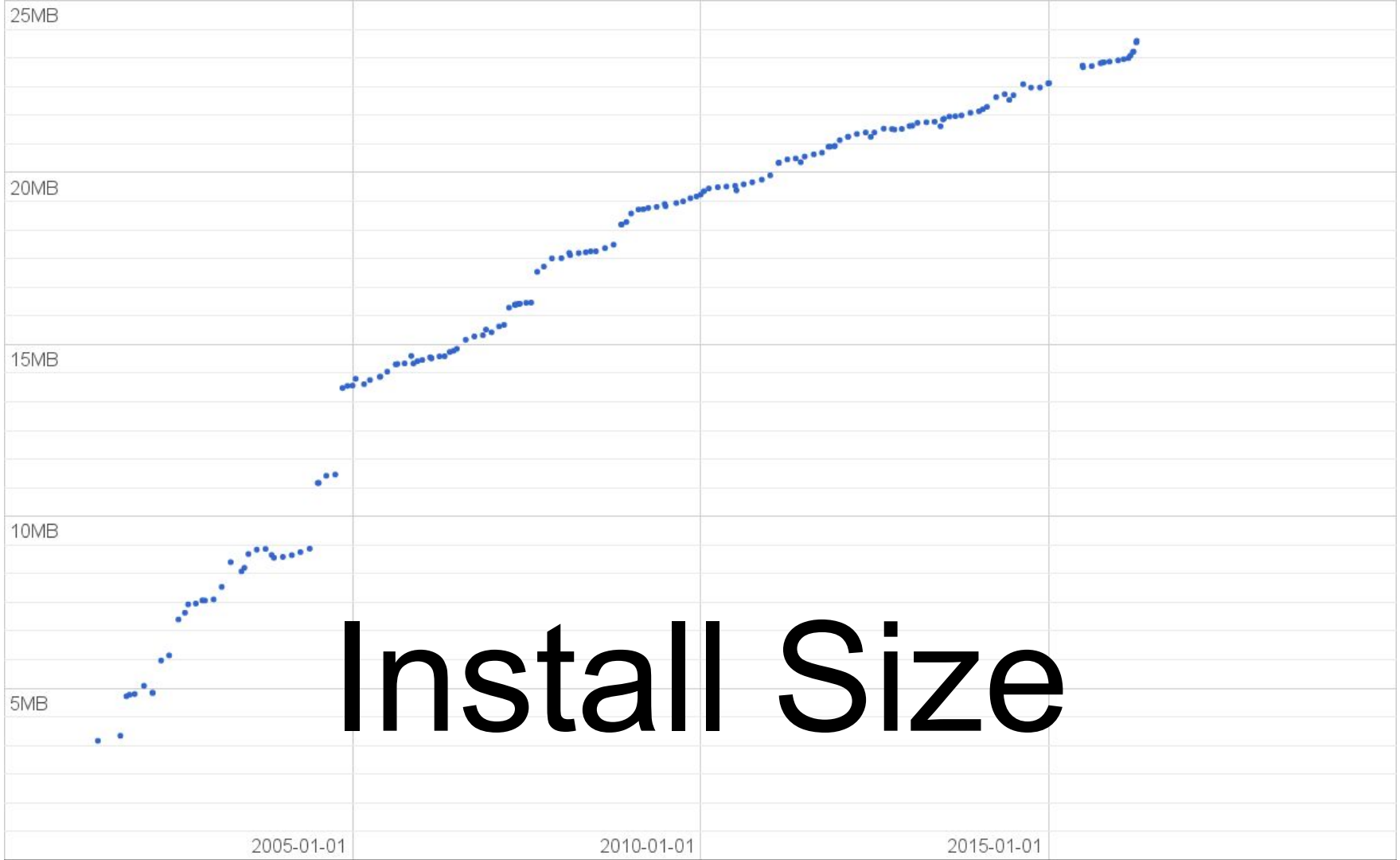
105s
90s
75s
60s
45s
30s
15s
2005-01-01
2010-01-01
2015-01-01
Build Time


8MB
7MB
6MB
5MB
4MB
3MB
2MB
1MB
2005-01-01
2010-01-01
2015-01-01
Binary Size


25MB
20MB
15MB
10MB
5MB
2005-01-01
2010-01-01
2015-01-01
Install Size

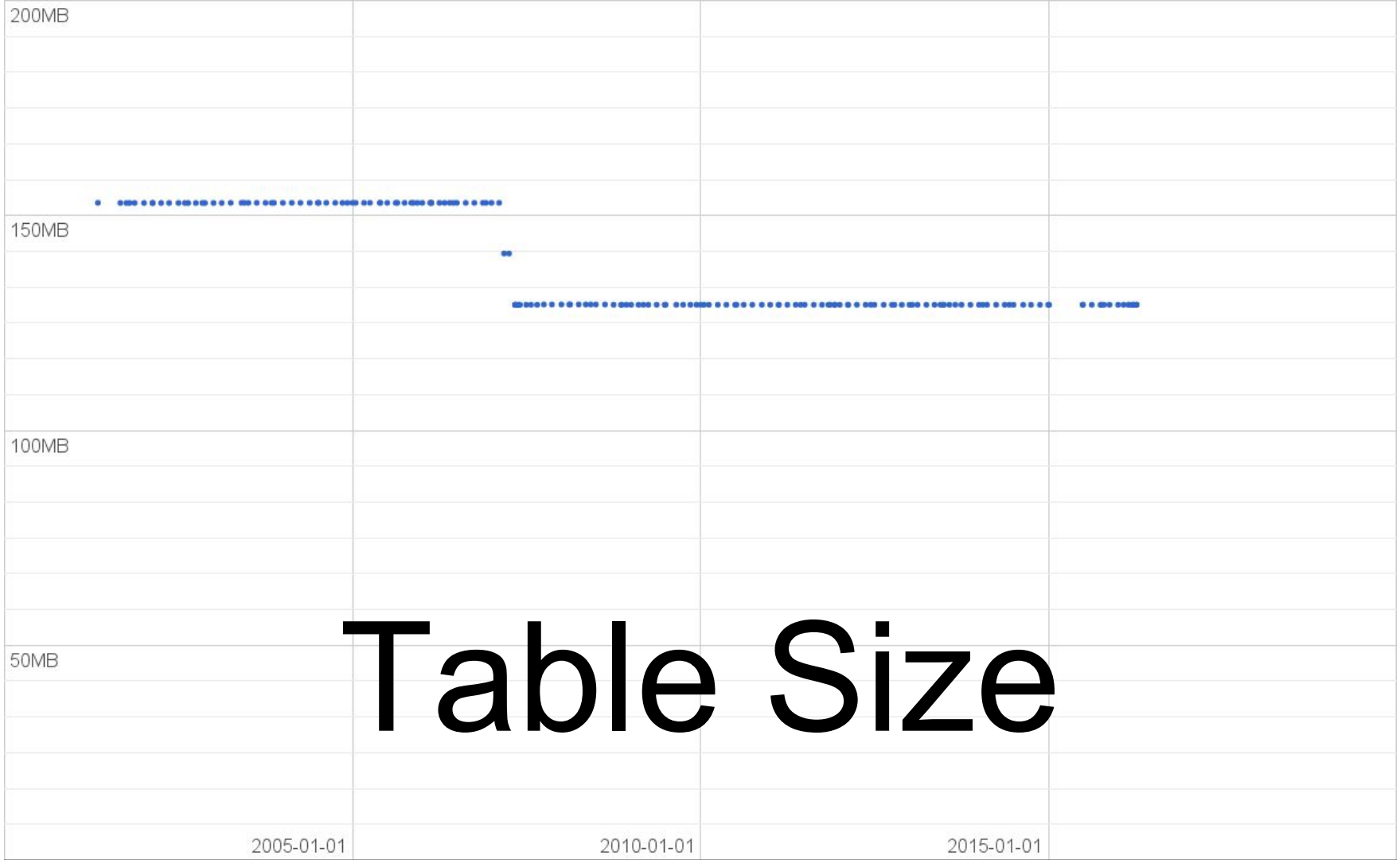


Table Size

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