📁 Android Public Tracker   37083350 ▾

← ↻ ☆   **Packed relocation could delay boot time?**   +1 ²   Hotlists (1)   Mark as Duplicate   🔔   ⋮

Comments (10)   Dependencies   Duplicates (0)   Blocking (0)   Resources (2)

Can't Repro   Bug   P3   + Add Hotlist   [AOSP] assigned

👥 **STATUS UPDATE**   No update yet.   Edit

📄 **DESCRIPTION** hy...@gmail.com created issue #1   Feb 24, 2016 08:08PM   ⋮

I have tested with Nexus 5.
Android L OS(5.1, LMY48M)
Andorid M OS(6.0, MMB29K)

execution flow.
1. Init process fork and exec.
2. Linker loads shared libraries.
3. invoke main() of app_process

1~3
L OS takes 1.2 seconds.
M OS takes 2.1 seconds.

Previous linker does not support android relocation,
M OS support packed relocation after below commit.

It seems that packed relocation increase file I/O at boot time.
And, It could cause a delay.

https://android-review.googlesource.com/#/c/135550/
android\bionic\linker\linker.cpp
  if (android_relocs_ != nullptr) {
    // check signature
    if (android_relocs_size_ > 3 &&
      android_relocs_[0] == 'A' &&
      android_relocs_[1] == 'P' &&
      android_relocs_[2] == 'S' &&
      android_relocs_[3] == '2') {
      DEBUG("[android relocating %s]", get_realpath());

      bool relocated = false;
      const uint8_t* packed_relocs = android_relocs_ + 4;
      const size_t packed_relocs_size = android_relocs_size_ - 4;

      relocated = relocate(
        version_tracker,
        packed_reloc_iterator<sleb128_decoder>(
         sleb128_decoder(packed_relocs, packed_relocs_size)),
        global_group, local_group);

     if (!relocated) {
      return false;
     }
    } else {
     DL_ERR("bad android relocation header.");
     return false;
    }
  }

✓ **Links (2)**   Hide all

"https://android-review.googlesource.com/#/c/135550/"   hy...@ #1
"https://android-review.googlesource.com/#/c/148052/"   hy...@ #7

COMMENTS   All comments ▾   ↓ Oldest first

◯ **dn...@google.com** <dn...@google.com>   Feb 24, 2016 08:22PM

Assigned to dn...@google.com.

◯ **hy...@gmail.com** <hy...@gmail.com> #2   Feb 26, 2016 12:46PM   ⋮

With teset application,
libandroid_runtime.so loading time takes more than twice.

Reporter   ◯ hy...@gmail.com

Type   Bug

Priority   P3

Severity   S3

Status   Won't fix (Not reproducible)

Access   Default access   View

Assignee   ◯ di...@google.com

Verifier   --

Collaborators   👥 _____ ⌃

CC   🔒 _____ ⌃
di...@google.com
dn...@google.com
en...@google.com
hy...@gmail.com

AOSP ID   201706

ReportedBy   Developer

Found In   --

Targeted To   --

Verified In   --

In Prod   ◯

M MR1
neo, /system/lib/libandroid_runtime.so 447 msec

L OS
neo, /system/lib/libandroid_runtime.so 206 msec


```c
#include <stdio.h>
#include <unistd.h>
#include <dlfcn.h>
#include <sys/time.h>
#include <sys/resource.h>

const char *librarys[] = {
    "/system/lib/libcutils.so",
    "/system/lib/libutils.so",
    "/system/lib/liblog.so",
    "/system/lib/libbinder.so",
    "/system/lib/libandroid_runtime.so",
    "/system/lib/libwilhelm.so",
    "/system/lib/libc++.so",
    "/system/lib/libc.so",
    "/system/lib/libm.so",
};

int measure_load_time(const char *name) {
    void *lib;
    struct timeval t0, t1;
    long mtime, seconds, useconds;

    //libmedia.so time
    gettimeofday(&t0, NULL);
    lib = dlopen(name, RTLD_NOW);
    if (lib == NULL) {
        fprintf(stderr, "Could not dlopen(%s): %s\n", name, dlerror());
        return 1;
    }
    gettimeofday(&t1, NULL);
    seconds  = t1.tv_sec  - t0.tv_sec;
    useconds = t1.tv_usec - t0.tv_usec;
    mtime = ((seconds) * 1000 + useconds/1000.0) + 0.5;
    printf("neo, %s %ld msec\n", name, mtime);
    dlclose(lib);

    return 1;
}


int main(int argc, char **argv)
{
    int i;
    for (i=0; i<sizeof(librarys)/sizeof(librarys[0]); i++) {
        measure_load_time(librarys[i]);
    }

    return 0;
}
```

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hy...@gmail.com <hy...@gmail.com> #3   Feb 26, 2016 07:10PM ⋮

```
01-01 09:39:17.934 W 8792    8792    linker   : neo, [ do_dlopen - find_library /system/lib/libandroid_runtime.so] start
01-01 09:39:17.934 W 8792    8792    linker   : neo, [ find_libraries /system/lib/libandroid_runtime.so]
01-01 09:39:17.934 W 8792    8792    linker   : neo,----[ load_library /system/lib/libandroid_runtime.so start]
01-01 09:39:17.936 W 8792    8792    linker   : neo,----[ load_library libmemtrack.so start]
01-01 09:39:17.937 W 8792    8792    linker   : neo,----[ load_library libandroidfw.so start]
01-01 09:39:17.938 W 8792    8792    linker   : neo,----[ load_library libexpat.so start]
01-01 09:39:17.939 W 8792    8792    linker   : neo,----[ load_library libnativehelper.so start]
01-01 09:39:17.940 W 8792    8792    linker   : neo,----[ load_library libutils.so start]
01-01 09:39:17.941 W 8792    8792    linker   : neo,----[ load_library libbinder.so start]
01-01 09:39:17.941 W 8792    8792    linker   : neo,----[ load_library libnetutils.so start]
01-01 09:39:17.943 W 8792    8792    linker   : neo,----[ load_library libui.so start]
01-01 09:39:17.944 W 8792    8792    linker   : neo,----[ load_library libgui.so start]
01-01 09:39:17.945 W 8792    8792    linker   : neo,----[ load_library libinput.so start]
01-01 09:39:17.947 W 8792    8792    linker   : neo,----[ load_library libinputflinger.so start]
01-01 09:39:17.948 W 8792    8792    linker   : neo,----[ load_library libcamera_client.so start]
01-01 09:39:17.950 W 8792    8792    linker   : neo,----[ load_library libcamera_metadata.so start]
01-01 09:39:17.951 W 8792    8792    linker   : neo,----[ load_library libskia.so start]
01-01 09:39:17.953 W 8792    8792    linker   : neo,----[ load_library libsqlite.so start]
01-01 09:39:17.954 W 8792    8792    linker   : neo,----[ load_library libEGL.so start]
01-01 09:39:17.955 W 8792    8792    linker   : neo,----[ load_library libGLESv1_CM.so start]
01-01 09:39:17.956 W 8792    8792    linker   : neo,----[ load_library libGLESv2.so start]
01-01 09:39:17.958 W 8792    8792    linker   : neo,----[ load_library libETC1.so start]
01-01 09:39:17.959 W 8792    8792    linker   : neo,----[ load_library libhardware.so start]
01-01 09:39:17.960 W 8792    8792    linker   : neo,----[ load_library libhardware_legacy.so start]
01-01 09:39:17.961 W 8792    8792    linker   : neo,----[ load_library libselinux.so start]
01-01 09:39:17.962 W 8792    8792    linker   : neo,----[ load_library libsonivox.so start]
```

```
01-01 09:39:17.963 W 8792    8792    linker  : neo,----[ load_library libcrypto.so start]
01-01 09:39:17.964 W 8792    8792    linker  : neo,----[ load_library libssl.so start]
01-01 09:39:17.965 W 8792    8792    linker  : neo,----[ load_library libicuuc.so start]
01-01 09:39:17.967 W 8792    8792    linker  : neo,----[ load_library libicui18n.so start]
01-01 09:39:17.968 W 8792    8792    linker  : neo,----[ load_library libmedia.so start]
01-01 09:39:17.969 W 8792    8792    linker  : neo,----[ load_library libjpeg.so start]
01-01 09:39:17.970 W 8792    8792    linker  : neo,----[ load_library libusbhost.so start]
01-01 09:39:17.971 W 8792    8792    linker  : neo,----[ load_library libharfbuzz_ng.so start]
01-01 09:39:17.973 W 8792    8792    linker  : neo,----[ load_library libz.so start]
01-01 09:39:17.975 W 8792    8792    linker  : neo,----[ load_library libaudioutils.so start]
01-01 09:39:17.977 W 8792    8792    linker  : neo,----[ load_library libpdfium.so start]
01-01 09:39:17.979 W 8792    8792    linker  : neo,----[ load_library libimg_utils.so start]
01-01 09:39:17.980 W 8792    8792    linker  : neo,----[ load_library libradio.so start]
01-01 09:39:17.981 W 8792    8792    linker  : neo,----[ load_library libsoundtrigger.so start]
01-01 09:39:17.983 W 8792    8792    linker  : neo,----[ load_library libminikin.so start]
01-01 09:39:17.984 W 8792    8792    linker  : neo,----[ load_library libprocessgroup.so start]
01-01 09:39:17.985 W 8792    8792    linker  : neo,----[ load_library libnativebridge.so start]
01-01 09:39:17.986 W 8792    8792    linker  : neo,----[ load_library libradio_metadata.so start]
01-01 09:39:17.987 W 8792    8792    linker  : neo,----[ load_library libhwui.so start]
01-01 09:39:17.988 W 8792    8792    linker  : neo,----[ load_library libregionalization.so start]
01-01 09:39:17.989 W 8792    8792    linker  : neo,----[ load_library libstdc++.so start]
01-01 09:39:17.990 W 8792    8792    linker  : neo,----[ load_library libbacktrace.so start]
01-01 09:39:17.991 W 8792    8792    linker  : neo,----[ load_library libsync.so start]
01-01 09:39:17.992 W 8792    8792    linker  : neo,----[ load_library libpng.so start]
01-01 09:39:17.995 W 8792    8792    linker  : neo,----[ load_library libft2.so start]
01-01 09:39:17.996 W 8792    8792    linker  : neo,----[ load_library libsnappy.so start]
01-01 09:39:17.997 W 8792    8792    linker  : neo,----[ load_library libGLES_trace.so start]
01-01 09:39:17.999 W 8792    8792    linker  : neo,----[ load_library libvolumevibratorcallback.so start]
01-01 09:39:18.000 W 8792    8792    linker  : neo,----[ load_library libwpa_client.so start]
01-01 09:39:18.001 W 8792    8792    linker  : neo,----[ load_library libwfcu.so start]
01-01 09:39:18.002 W 8792    8792    linker  : neo,----[ load_library libpcre.so start]
01-01 09:39:18.003 W 8792    8792    linker  : neo,----[ load_library libstagefright_foundation.so start]
01-01 09:39:18.004 W 8792    8792    linker  : neo,----[ load_library libnbaio.so start]
01-01 09:39:18.006 W 8792    8792    linker  : neo,----[ load_library libmedia_ex.so start]
01-01 09:39:18.007 W 8792    8792    linker  : neo,----[ load_library libbrunch.so start]
01-01 09:39:18.009 W 8792    8792    linker  : neo,----[ load_library libspeexresampler.so start]
01-01 09:39:18.010 W 8792    8792    linker  : neo,----[ load_library libRS.so start]
01-01 09:39:18.011 W 8792    8792    linker  : neo,----[ load_library libRScpp.so start]
01-01 09:39:18.012 W 8792    8792    linker  : neo,----[ load_library libbase.so start]
01-01 09:39:18.013 W 8792    8792    linker  : neo,----[ load_library libunwind.so start]
01-01 09:39:18.013 W 8792    8792    linker  : neo,----[ load_library libprotobuf-cpp-lite.so start]
01-01 09:39:18.015 W 8792    8792    linker  : neo,----[ load_library libpowermanager.so start]
01-01 09:39:18.016 W 8792    8792    linker  : neo,----[ load_library libcommon_time_client.so start]
01-01 09:39:18.017 W 8792    8792    linker  : neo,----[ load_library liblgdrm_client.so start]
01-01 09:39:18.018 W 8792    8792    linker  : neo,----[ load_library libWVStreamControlAPI_L3.so start]
01-01 09:39:18.021 W 8792    8792    linker  : neo,----[ load_library libbroadcast_simpletsparser.so start]
01-01 09:39:18.022 W 8792    8792    linker  : neo,----[ load_library libbcc.so start]
01-01 09:39:18.023 W 8792    8792    linker  : neo,----[ load_library libbcinfo.so start]
01-01 09:39:18.025 W 8792    8792    linker  : neo,----[ load_library libLLVM.so start]
01-01 09:39:18.026 W 8792    8792    linker  : neo,----[ load_library libbroadcast_drmfile.so start]
01-01 09:39:18.034 W 8792    8792    linker  : neo, -------[ link_image /system/lib/libandroid_runtime.so] android_relocs_  6
msec
01-01 09:39:18.048 W 8792    8792    linker  : neo,----[ link_image /system/lib/libandroid_runtime.so] takes 20 msec
01-01 09:39:18.049 W 8792    8792    linker  : neo,----[ link_image /system/lib/libmemtrack.so] takes 0 msec
01-01 09:39:18.052 W 8792    8792    linker  : neo,----[ link_image /system/lib/libandroidfw.so] takes 3 msec
01-01 09:39:18.052 W 8792    8792    linker  : neo,----[ link_image /system/lib/libexpat.so] takes 0 msec
01-01 09:39:18.053 W 8792    8792    linker  : neo,----[ link_image /system/lib/libnativehelper.so] takes 1 msec
01-01 09:39:18.056 W 8792    8792    linker  : neo,----[ link_image /system/lib/libutils.so] takes 3 msec
01-01 09:39:18.067 W 8792    8792    linker  : neo, -------[ link_image /system/lib/libbinder.so] android_relocs_  10 msec
01-01 09:39:18.069 W 8792    8792    linker  : neo,----[ link_image /system/lib/libbinder.so] takes 12 msec
01-01 09:39:18.070 W 8792    8792    linker  : neo,----[ link_image /system/lib/libnetutils.so] takes 1 msec
01-01 09:39:18.071 W 8792    8792    linker  : neo,----[ link_image /system/lib/libui.so] takes 1 msec
01-01 09:39:18.094 W 8792    8792    linker  : neo, -------[ link_image /system/lib/libgui.so] android_relocs_  23 msec
01-01 09:39:18.097 W 8792    8792    linker  : neo,----[ link_image /system/lib/libgui.so] takes 26 msec
01-01 09:39:18.099 W 8792    8792    linker  : neo, -------[ link_image /system/lib/libinput.so] android_relocs_  1 msec
01-01 09:39:18.100 W 8792    8792    linker  : neo,----[ link_image /system/lib/libinput.so] takes 3 msec
01-01 09:39:18.104 W 8792    8792    linker  : neo, -------[ link_image /system/lib/libinputflinger.so] android_relocs_  3 msec
01-01 09:39:18.107 W 8792    8792    linker  : neo,----[ link_image /system/lib/libinputflinger.so] takes 7 msec
01-01 09:39:18.118 W 8792    8792    linker  : neo, -------[ link_image /system/lib/libcamera_client.so] android_relocs_  10
msec
01-01 09:39:18.119 W 8792    8792    linker  : neo,----[ link_image /system/lib/libcamera_client.so] takes 12 msec
01-01 09:39:18.120 W 8792    8792    linker  : neo,----[ link_image /system/lib/libcamera_metadata.so] takes 0 msec
01-01 09:39:18.147 W 8792    8792    linker  : neo, -------[ link_image /system/lib/libskia.so] android_relocs_  26 msec
01-01 09:39:18.168 W 8792    8792    linker  : neo,----[ link_image /system/lib/libskia.so] takes 48 msec
01-01 09:39:18.169 W 8792    8792    linker  : neo, -------[ link_image /system/lib/libsqlite.so] android_relocs_  0 msec
01-01 09:39:18.171 W 8792    8792    linker  : neo,----[ link_image /system/lib/libsqlite.so] takes 2 msec
01-01 09:39:18.173 W 8792    8792    linker  : neo, -------[ link_image /system/lib/libEGL.so] android_relocs_  2 msec
01-01 09:39:18.174 W 8792    8792    linker  : neo,----[ link_image /system/lib/libEGL.so] takes 3 msec
01-01 09:39:18.175 W 8792    8792    linker  : neo,----[ link_image /system/lib/libGLESv1_CM.so] takes 0 msec
01-01 09:39:18.175 W 8792    8792    linker  : neo,----[ link_image /system/lib/libGLESv2.so] takes 0 msec
01-01 09:39:18.175 W 8792    8792    linker  : neo,----[ link_image /system/lib/libETC1.so] takes 0 msec
01-01 09:39:18.176 W 8792    8792    linker  : neo,----[ link_image /system/lib/libhardware.so] takes 0 msec
01-01 09:39:18.176 W 8792    8792    linker  : neo,----[ link_image /system/lib/libhardware_legacy.so] takes 1 msec
01-01 09:39:18.178 W 8792    8792    linker  : neo,----[ link_image /system/lib/libselinux.so] takes 1 msec
01-01 09:39:18.179 W 8792    8792    linker  : neo,----[ link_image /system/lib/libsonivox.so] takes 1 msec
01-01 09:39:18.187 W 8792    8792    linker  : neo,----[ link_image /system/lib/libcrypto.so] takes 8 msec
```

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01-01 09:39:18.188 W 8792    8792    linker   : neo,----[ link_image /system/lib/libssl.so] takes 2 msec
01-01 09:39:18.196 W 8792    8792    linker   : neo, -------[ link_image /system/lib/libicuuc.so] android_relocs_  8 msec
01-01 09:39:18.204 W 8792    8792    linker   : neo,----[ link_image /system/lib/libicuuc.so] takes 15 msec
01-01 09:39:18.222 W 8792    8792    linker   : neo, -------[ link_image /system/lib/libicui18n.so] android_relocs_  18 msec
01-01 09:39:18.240 W 8792    8792    linker   : neo,----[ link_image /system/lib/libicui18n.so] takes 37 msec
01-01 09:39:18.311 W 8792    8792    linker   : neo, -------[ link_image /system/lib/libmedia.so] android_relocs_  70 msec
01-01 09:39:18.318 W 8792    8792    linker   : neo,----[ link_image /system/lib/libmedia.so] takes 78 msec
01-01 09:39:18.319 W 8792    8792    linker   : neo,----[ link_image /system/lib/libjpeg.so] takes 1 msec
01-01 09:39:18.320 W 8792    8792    linker   : neo,----[ link_image /system/lib/libusbhost.so] takes 1 msec
01-01 09:39:18.321 W 8792    8792    linker   : neo,----[ link_image /system/lib/libharfbuzz_ng.so] takes 1 msec
01-01 09:39:18.322 W 8792    8792    linker   : neo,----[ link_image /system/lib/libz.so] takes 1 msec
01-01 09:39:18.323 W 8792    8792    linker   : neo,----[ link_image /system/lib/libaudioutils.so] takes 1 msec
01-01 09:39:18.333 W 8792    8792    linker   : neo, -------[ link_image /system/lib/libpdfium.so] android_relocs_  10 msec
01-01 09:39:18.353 W 8792    8792    linker   : neo,----[ link_image /system/lib/libpdfium.so] takes 30 msec
01-01 09:39:18.355 W 8792    8792    linker   : neo,----[ link_image /system/lib/libimg_utils.so] takes 2 msec
01-01 09:39:18.358 W 8792    8792    linker   : neo, -------[ link_image /system/lib/libradio.so] android_relocs_  3 msec
01-01 09:39:18.359 W 8792    8792    linker   : neo,----[ link_image /system/lib/libradio.so] takes 4 msec
01-01 09:39:18.363 W 8792    8792    linker   : neo, -------[ link_image /system/lib/libsoundtrigger.so] android_relocs_  4 msec
01-01 09:39:18.364 W 8792    8792    linker   : neo,----[ link_image /system/lib/libsoundtrigger.so] takes 4 msec
01-01 09:39:18.366 W 8792    8792    linker   : neo,----[ link_image /system/lib/libminikin.so] takes 2 msec
01-01 09:39:18.366 W 8792    8792    linker   : neo,----[ link_image /system/lib/libprocessgroup.so] takes 0 msec
01-01 09:39:18.366 W 8792    8792    linker   : neo,----[ link_image /system/lib/libnativebridge.so] takes 0 msec
01-01 09:39:18.367 W 8792    8792    linker   : neo,----[ link_image /system/lib/libradio_metadata.so] takes 0 msec
01-01 09:39:18.369 W 8792    8792    linker   : neo, -------[ link_image /system/lib/libhwui.so] android_relocs_  2 msec
01-01 09:39:18.373 W 8792    8792    linker   : neo,----[ link_image /system/lib/libhwui.so] takes 6 msec
01-01 09:39:18.374 W 8792    8792    linker   : neo,----[ link_image /system/lib/libregionalization.so] takes 0 msec
01-01 09:39:18.374 W 8792    8792    linker   : neo,----[ link_image /system/lib/libstdc++.so] takes 0 msec
01-01 09:39:18.376 W 8792    8792    linker   : neo,----[ link_image /system/lib/libbacktrace.so] takes 2 msec
01-01 09:39:18.377 W 8792    8792    linker   : neo,----[ link_image /system/lib/libsync.so] takes 0 msec
01-01 09:39:18.379 W 8792    8792    linker   : neo,----[ link_image /system/lib/libpng.so] takes 3 msec
01-01 09:39:18.387 W 8792    8792    linker   : neo,----[ link_image /system/lib/libft2.so] takes 7 msec
01-01 09:39:18.388 W 8792    8792    linker   : neo,----[ link_image /system/lib/libsnappy.so] takes 1 msec
01-01 09:39:18.405 W 8792    8792    linker   : neo,----[ link_image /system/lib/libGLES_trace.so] takes 17 msec
01-01 09:39:18.406 W 8792    8792    linker   : neo,----[ link_image /system/lib/libvolumevibratorcallback.so] takes 1 msec
01-01 09:39:18.407 W 8792    8792    linker   : neo,----[ link_image /system/lib/libwpa_client.so] takes 1 msec
01-01 09:39:18.407 W 8792    8792    linker   : neo,----[ link_image /system/lib/libwfcu.so] takes 0 msec
01-01 09:39:18.408 W 8792    8792    linker   : neo,----[ link_image /system/lib/libpcre.so] takes 1 msec
01-01 09:39:18.413 W 8792    8792    linker   : neo,----[ link_image /system/lib/libstagefright_foundation.so] takes 5 msec
01-01 09:39:18.415 W 8792    8792    linker   : neo,----[ link_image /system/lib/libnbaio.so] takes 2 msec
01-01 09:39:18.415 W 8792    8792    linker   : neo,----[ link_image /system/lib/libmedia_ex.so] takes 0 msec
01-01 09:39:18.420 W 8792    8792    linker   : neo,----[ link_image /system/lib/libbrunch.so] takes 5 msec
01-01 09:39:18.421 W 8792    8792    linker   : neo,----[ link_image /system/lib/libspeexresampler.so] takes 0 msec
01-01 09:39:18.436 W 8792    8792    linker   : neo,----[ link_image /system/lib/libRS.so] takes 15 msec
01-01 09:39:18.438 W 8792    8792    linker   : neo,----[ link_image /system/lib/libRScpp.so] takes 2 msec
01-01 09:39:18.440 W 8792    8792    linker   : neo,----[ link_image /system/lib/libbase.so] takes 1 msec
01-01 09:39:18.441 W 8792    8792    linker   : neo,----[ link_image /system/lib/libunwind.so] takes 1 msec
01-01 09:39:18.445 W 8792    8792    linker   : neo,----[ link_image /system/lib/libprotobuf-cpp-lite.so] takes 4 msec
01-01 09:39:18.446 W 8792    8792    linker   : neo,----[ link_image /system/lib/libpowermanager.so] takes 1 msec
01-01 09:39:18.451 W 8792    8792    linker   : neo, -------[ link_image /system/lib/libcommon_time_client.so] android_relocs_
  5 msec
01-01 09:39:18.452 W 8792    8792    linker   : neo,----[ link_image /system/lib/libcommon_time_client.so] takes 5 msec
01-01 09:39:18.456 W 8792    8792    linker   : neo, -------[ link_image /system/lib/liblgdrm_client.so] android_relocs_  4 msec
01-01 09:39:18.458 W 8792    8792    linker   : neo,----[ link_image /system/lib/liblgdrm_client.so] takes 6 msec
01-01 09:39:18.467 W 8792    8792    linker   : neo,----[ link_image /system/vendor/lib/libWVStreamControlAPI_L3.so] takes 9
 msec
01-01 09:39:18.470 W 8792    8792    linker   : neo,----[ link_image /system/lib/libbroadcast_simpletsparser.so] takes 3 msec
01-01 09:39:18.477 W 8792    8792    linker   : neo,----[ link_image /system/lib/libbcc.so] takes 7 msec
01-01 09:39:18.483 W 8792    8792    linker   : neo,----[ link_image /system/lib/libbcinfo.so] takes 6 msec
01-01 09:39:18.621 W 8792    8792    linker   : neo, -------[ link_image /system/lib/libLLVM.so] android_relocs_  138 msec
01-01 09:39:18.738 W 8792    8792    linker   : neo,----[ link_image /system/lib/libLLVM.so] takes 254 msec
01-01 09:39:18.738 W 8792    8792    linker   : neo,----[ link_image /system/lib/libbroadcast_drmfile.so] takes 0 msec
01-01 09:39:18.738 W 8792    8792    linker   : neo, [ do_dlopen - find_library /system/lib/libandroid_runtime.so] takes  804
 msec
```

dn...@google.com <dn...@google.com> #4   Feb 29, 2016 11:45PM ⋮

We have passed this defect on to the development team and will update this issue with more information as it becomes
available.

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en...@google.com <en...@google.com>   Mar 1, 2016 02:52AM

Reassigned to di...@google.com.

---

di...@google.com <di...@google.com> #5   Mar 1, 2016 06:15AM ⋮

Status: Won't Fix (Not Reproducible)

running on the image with packed relocations:

run 1:
neo, /system/lib/libcutils.so 1.549000 msec
neo, /system/lib/libutils.so 5.701000 msec
neo, /system/lib/liblog.so 0.600000 msec
neo, /system/lib/libbinder.so 11.471000 msec

neo, /system/lib/libandroid_runtime.so 408.077000 msec
neo, /system/lib/libwilhelm.so 502.331000 msec
neo, /system/lib/libc++.so 0.282000 msec
neo, /system/lib/libc.so 0.179000 msec
neo, /system/lib/libm.so 0.177000 msec

run 2:
neo, /system/lib/libcutils.so 1.569000 msec
neo, /system/lib/libutils.so 5.639000 msec
neo, /system/lib/liblog.so 0.602000 msec
neo, /system/lib/libbinder.so 11.400000 msec
neo, /system/lib/libandroid_runtime.so 410.308000 msec
neo, /system/lib/libwilhelm.so 503.795000 msec
neo, /system/lib/libc++.so 0.289000 msec
neo, /system/lib/libc.so 0.182000 msec
neo, /system/lib/libm.so 0.175000 msec

run 3:
neo, /system/lib/libcutils.so 1.615000 msec
neo, /system/lib/libutils.so 5.556000 msec
neo, /system/lib/liblog.so 0.592000 msec
neo, /system/lib/libbinder.so 11.699000 msec
neo, /system/lib/libandroid_runtime.so 442.181000 msec
neo, /system/lib/libwilhelm.so 500.774000 msec
neo, /system/lib/libc++.so 0.279000 msec
neo, /system/lib/libc.so 0.176000 msec
neo, /system/lib/libm.so 0.172000 msec

----

running on the image WITHOUT packed relocations:
(you can do that by setting DISABLE_RELOCATION_PACKER=true in your enviroment)

run 1:
neo, /system/lib/libcutils.so 1.737000 msec
neo, /system/lib/libutils.so 5.983000 msec
neo, /system/lib/liblog.so 0.658000 msec
neo, /system/lib/libbinder.so 12.137000 msec
neo, /system/lib/libandroid_runtime.so 415.857000 msec
neo, /system/lib/libwilhelm.so 509.452000 msec
neo, /system/lib/libc++.so 0.332000 msec
neo, /system/lib/libc.so 0.238000 msec
neo, /system/lib/libm.so 0.236000 msec

run 2:
neo, /system/lib/libcutils.so 1.714000 msec
neo, /system/lib/libutils.so 5.991000 msec
neo, /system/lib/liblog.so 0.658000 msec
neo, /system/lib/libbinder.so 11.977000 msec
neo, /system/lib/libandroid_runtime.so 416.081000 msec
neo, /system/lib/libwilhelm.so 509.401000 msec
neo, /system/lib/libc++.so 0.330000 msec
neo, /system/lib/libc.so 0.235000 msec
neo, /system/lib/libm.so 0.231000 msec

run 3:
neo, /system/lib/libcutils.so 1.571000 msec
neo, /system/lib/libutils.so 5.590000 msec
neo, /system/lib/liblog.so 0.597000 msec
neo, /system/lib/libbinder.so 11.444000 msec
neo, /system/lib/libandroid_runtime.so 408.328000 msec
neo, /system/lib/libwilhelm.so 498.696000 msec
neo, /system/lib/libc++.so 0.271000 msec
neo, /system/lib/libc.so 0.176000 msec
neo, /system/lib/libm.so 0.176000 msec

As you can see it is pretty much within margin of error with hint of image with packed relocations enabled being slightly faster
than without it (it is expected - because of reduced i/o: with packed relocations linker reads less bytes from the elf-file)

di...@google.com <di...@google.com> #6   Mar 1, 2016 06:22AM ⋮

The slowdown you see is most likely because of the symbol lookup in the linker. In L linker was looking for a symbol in main
executable -> ld_preloads -> this library -> DT_NEEDED libraries; this was changed in M.

The spec implies breadth-first lookup order in the local scope (the local scope is the transitive closure of DT_NEEDED shared
libraries), which means that for every symbol search starts from the top of the dependency tree and proceed on breadth-first
search order until it reaches bottom of the tree (or finds a symbol).

hy...@gmail.com <hy...@gmail.com> #7   Mar 1, 2016 03:55PM ⋮

Thanks for your reply,
I have tested after revert below commit.
https://android-review.googlesource.com/#/c/148052/

As you mentioned,
Disable android packed relocation has no effect reduce loading time.

Is it possible to test M OS without changes?

di...@google.com <di...@google.com> #8   Mar 1, 2016 04:06PM ⋮

If you mean changes in symbol lookup - the device will not boot with high probability.
The question is why would you want to do that - most changes in the linker did speed up loading time of jni libraries. If you load a library from the app you will see the difference.

The slowdown has only affected large executables and native libs (with rich dependency trees). In the case of app_process the loading happens once per boot and it sound like a bad idea to trade correctness for the speed in this scenario.

hy...@gmail.com <hy...@gmail.com> #9   Mar 1, 2016 05:16PM ⋮

[Comment deleted]

hy...@gmail.com <hy...@gmail.com> #10   Mar 1, 2016 05:45PM ⋮

Because M OS have delay between below 1 and 3.
1. Init process fork and exec zygote process.
2. Linker loads shared libraries.
3. invoke main() of app_process

As a result,
boot_progress_start is delayed.

It seems that libandroid_runtime.so has rich depencency trees.
It requires more than 60 shared libraries.

And, at boot time,
Many services tring to start and load libraries.
It cause a lack of CPU/IO resources.