# StorageManagerService

**public long** getStorageLowBytes(File path) {  
 **final long** lowPercent = Settings.Global.getInt(mResolver,  
 Settings.Global.SYS\_STORAGE\_THRESHOLD\_PERCENTAGE, DEFAULT\_THRESHOLD\_PERCENTAGE);  
 **final long** lowBytes = (path.getTotalSpace() \* lowPercent) / 100;  
  
 **final long** maxLowBytes = Settings.Global.getLong(mResolver,  
 Settings.Global.SYS\_STORAGE\_THRESHOLD\_MAX\_BYTES, DEFAULT\_THRESHOLD\_MAX\_BYTES);  
  
 **return** Math.min(lowBytes, maxLowBytes);  
}

**// /小于500M时为低存储**

**private static final int DEFAULT\_THRESHOLD\_PERCENTAGE = 5**;  
**private static final long DEFAULT\_THRESHOLD\_MAX\_BYTES = 500** \* MB\_IN\_BYTES;

C:\Users\10288>adb shell settings get Global SYS\_STORAGE\_THRESHOLD\_PERCENTAGE

null

C:\Users\10288>adb shell settings get Global SYS\_STORAGE\_THRESHOLD\_MAX\_BYTES

null

# DeviceStorageMonitorService

frameworks/base/services/core/java/com/android/server/storage/DeviceStorageMonitorS

**private final** AtomicInteger mSeq = **new** AtomicInteger(1);

设备存储监视器服务是一个模块用来

    1.监视设备存储（“/ data”）。

    2.每60秒扫描一次免费存储空间(谷歌默认值)

    3.当设备的存储空间不足时生成“低存储”通知。 //updateNotifications

    4.引导用户管理设备中安装的所有应用程序，并发送意图。 //updateBroadcasts

    5.存储严重不足时显示警告对话框。

    6.为AMS/PMS提供公共API以查询存储状态

## onStart()

@Override  
**public void** onStart() {  
   
 mCacheFileDeletedObserver = **new** CacheFileDeletedObserver();  
 mCacheFileDeletedObserver.startWatching();  
  
 *// Ensure that the notification channel is set up* PackageManager packageManager = context.getPackageManager();  
 **boolean** isTv = packageManager.hasSystemFeature(PackageManager.FEATURE\_LEANBACK);  
  
 publishBinderService(SERVICE, mRemoteService);  
 publishLocalService(DeviceStorageMonitorInternal.**class**, mLocalService);  
  
 *// Kick off pass to examine storage state* mHandler.removeMessages(MSG\_CHECK);  
 mHandler.obtainMessage(MSG\_CHECK).sendToTarget();  
}

### CacheFileDeletedObserver

**private static class** CacheFileDeletedObserver **extends** FileObserver {  
 **public** CacheFileDeletedObserver() {  
 **super**(Environment.getDownloadCacheDirectory().getAbsolutePath(), FileObserver.DELETE);  
 }  
  
 @Override  
 **public void** onEvent(**int** event, String path) {  
 EventLogTags.writeCacheFileDeleted(path);  
 }  
}

### mHandler

**private final** Handler mHandler = **new** Handler(IoThread.get().getLooper()) {  
 @Override  
 **public void** handleMessage(Message msg) {  
 **switch** (msg.what) {  
 **case** MSG\_CHECK:  
 check();  
 **return**;  
 }  
 }  
};

## check():60S

**private static final long** DEFAULT\_CHECK\_INTERVAL = DateUtils.MINUTE\_IN\_MILLIS;

@WorkerThread  
**private void** check() {  
 **final** StorageManager storage = getContext().getSystemService(StorageManager.**class**);  
 **final int** seq = mSeq.get();  
  
 *// Check every mounted private volume to see if they're low on space* **for** (VolumeInfo vol : storage.getWritablePrivateVolumes()) {  
 **final** File file = vol.getPath();  
 **final long** fullBytes = storage.getStorageFullBytes(file);  
 **final long** lowBytes = storage.getStorageLowBytes(file);  
  
 *// Automatically trim cached data when nearing the low threshold;  
 // when it's within 150% of the threshold, we try trimming usage  
 // back to 200% of the threshold.* **if** (file.getUsableSpace() < (lowBytes \* 3) / 2) {  
 **final** PackageManagerService pms = (PackageManagerService) ServiceManager  
 .getService(**"package"**);  
 **try** {  
 pms.freeStorage(vol.getFsUuid(), lowBytes \* 2, 0);  
 } **catch** (IOException e) {  
 Slog.w(TAG, e);  
 }  
 }  
  
 *// Send relevant broadcasts and show notifications based on any  
 // recently noticed state transitions.* **final** UUID uuid = StorageManager.convert(vol.getFsUuid());  
 **final** State state = findOrCreateState(uuid);  
 **final long** totalBytes = file.getTotalSpace();  
 **final long** usableBytes = file.getUsableSpace();  
  
 **int** oldLevel = state.level;  
 **int** newLevel;  
 **if** (mForceLevel != State.LEVEL\_UNKNOWN) {  
 *// When in testing mode, use unknown old level to force sending  
 // of any relevant broadcasts.* oldLevel = State.LEVEL\_UNKNOWN;  
 newLevel = mForceLevel;  
 } **else if** (usableBytes <= fullBytes) {  
 newLevel = State.LEVEL\_FULL;  
 } **else if** (usableBytes <= lowBytes) {  
 newLevel = State.LEVEL\_LOW;  
 } **else if** (StorageManager.UUID\_DEFAULT.equals(uuid) && !isBootImageOnDisk()  
 && usableBytes < BOOT\_IMAGE\_STORAGE\_REQUIREMENT) {  
 newLevel = State.LEVEL\_LOW;  
 } **else** {  
 newLevel = State.LEVEL\_NORMAL;  
 }  
  
 *// Log whenever we notice drastic storage changes* **if** ((Math.abs(state.lastUsableBytes - usableBytes) > DEFAULT\_LOG\_DELTA\_BYTES)  
 || oldLevel != newLevel) {  
 EventLogTags.writeStorageState(uuid.toString(), oldLevel, newLevel,  
 usableBytes, totalBytes);  
 state.lastUsableBytes = usableBytes;  
 }  
  
 updateNotifications(vol, oldLevel, newLevel);  
 updateBroadcasts(vol, oldLevel, newLevel, seq);  
  
 state.level = newLevel;  
 }  
  
 *// Loop around to check again in future; we don't remove messages since  
 // there might be an immediate request pending.* **if** (!mHandler.hasMessages(MSG\_CHECK)) {  
 mHandler.sendMessageDelayed(mHandler.obtainMessage(MSG\_CHECK),  
 DEFAULT\_CHECK\_INTERVAL);  
 }  
}

## updateNotifications

**private void** updateNotifications(VolumeInfo vol, **int** oldLevel, **int** newLevel) {  
 **final** Context context = getContext();  
 **final** UUID uuid = StorageManager.convert(vol.getFsUuid());  
  
 **if** (State.isEntering(State.LEVEL\_LOW, oldLevel, newLevel)) {  
 Intent lowMemIntent = **new** Intent(StorageManager.ACTION\_MANAGE\_STORAGE);  
 lowMemIntent.putExtra(StorageManager.EXTRA\_UUID, uuid);  
 lowMemIntent.addFlags(Intent.FLAG\_ACTIVITY\_NEW\_TASK);  
  
 **final** CharSequence title = context.getText(  
 com.android.internal.R.string.low\_internal\_storage\_view\_title);  
  
 **final** CharSequence details;  
 **if** (StorageManager.UUID\_DEFAULT.equals(uuid)) {  
 details = context.getText(isBootImageOnDisk()  
 ? com.android.internal.R.string.low\_internal\_storage\_view\_text  
 : com.android.internal.R.string.low\_internal\_storage\_view\_text\_no\_boot);  
 } **else** {  
 details = context.getText(  
 com.android.internal.R.string.low\_internal\_storage\_view\_text);  
 }  
  
 PendingIntent intent = PendingIntent.getActivityAsUser(context, 0, lowMemIntent, 0,  
 **null**, UserHandle.CURRENT);  
 Notification notification =  
 **new** Notification.Builder(context, SystemNotificationChannels.ALERTS)  
 .setSmallIcon(com.android.internal.R.drawable.stat\_notify\_disk\_full)  
 .setTicker(title)  
 .setColor(context.getColor(  
 com.android.internal.R.color.system\_notification\_accent\_color))  
 .setContentTitle(title)  
 .setContentText(details)  
 .setContentIntent(intent)  
 .setStyle(**new** Notification.BigTextStyle()  
 .bigText(details))  
 .setVisibility(Notification.VISIBILITY\_PUBLIC)  
 .setCategory(Notification.CATEGORY\_SYSTEM)  
 .extend(**new** Notification.TvExtender()  
 .setChannelId(TV\_NOTIFICATION\_CHANNEL\_ID))  
 .build();  
 notification.flags |= Notification.FLAG\_NO\_CLEAR;  
 mNotifManager.notifyAsUser(uuid.toString(), SystemMessage.NOTE\_LOW\_STORAGE,  
 notification, UserHandle.ALL);  
 } **else if** (State.isLeaving(State.LEVEL\_LOW, oldLevel, newLevel)) {  
 mNotifManager.cancelAsUser(uuid.toString(), SystemMessage.NOTE\_LOW\_STORAGE,  
 UserHandle.ALL);  
 }  
}

## updateBroadcasts

**private void** updateBroadcasts(VolumeInfo vol, **int** oldLevel, **int** newLevel, **int** seq) {  
 **if** (!Objects.equals(StorageManager.UUID\_PRIVATE\_INTERNAL, vol.getFsUuid())) {  
 *// We don't currently send broadcasts for secondary volumes* **return**;  
 }  
  
 **final** Intent lowIntent = **new** Intent(Intent.ACTION\_DEVICE\_STORAGE\_LOW)  
 .addFlags(Intent.FLAG\_RECEIVER\_REGISTERED\_ONLY\_BEFORE\_BOOT  
 | Intent.FLAG\_RECEIVER\_INCLUDE\_BACKGROUND  
 | Intent.FLAG\_RECEIVER\_VISIBLE\_TO\_INSTANT\_APPS)  
 .putExtra(EXTRA\_SEQUENCE, seq);  
 **final** Intent notLowIntent = **new** Intent(Intent.ACTION\_DEVICE\_STORAGE\_OK)  
 .addFlags(Intent.FLAG\_RECEIVER\_REGISTERED\_ONLY\_BEFORE\_BOOT  
 | Intent.FLAG\_RECEIVER\_INCLUDE\_BACKGROUND  
 | Intent.FLAG\_RECEIVER\_VISIBLE\_TO\_INSTANT\_APPS)  
 .putExtra(EXTRA\_SEQUENCE, seq);  
  
 **if** (State.isEntering(State.LEVEL\_LOW, oldLevel, newLevel)) {  
 getContext().sendStickyBroadcastAsUser(lowIntent, UserHandle.ALL);  
 } **else if** (State.isLeaving(State.LEVEL\_LOW, oldLevel, newLevel)) {  
 getContext().removeStickyBroadcastAsUser(lowIntent, UserHandle.ALL);  
 getContext().sendBroadcastAsUser(notLowIntent, UserHandle.ALL);  
 }  
  
 **final** Intent fullIntent = **new** Intent(Intent.ACTION\_DEVICE\_STORAGE\_FULL)  
 .addFlags(Intent.FLAG\_RECEIVER\_REGISTERED\_ONLY\_BEFORE\_BOOT)  
 .putExtra(EXTRA\_SEQUENCE, seq);  
 **final** Intent notFullIntent = **new** Intent(Intent.ACTION\_DEVICE\_STORAGE\_NOT\_FULL)  
 .addFlags(Intent.FLAG\_RECEIVER\_REGISTERED\_ONLY\_BEFORE\_BOOT)  
 .putExtra(EXTRA\_SEQUENCE, seq);  
  
 **if** (State.isEntering(State.LEVEL\_FULL, oldLevel, newLevel)) {  
 getContext().sendStickyBroadcastAsUser(fullIntent, UserHandle.ALL);  
 } **else if** (State.isLeaving(State.LEVEL\_FULL, oldLevel, newLevel)) {  
 getContext().removeStickyBroadcastAsUser(fullIntent, UserHandle.ALL);  
 getContext().sendBroadcastAsUser(notFullIntent, UserHandle.ALL);  
 }  
}

## 流程图

