Ion@XDC2017

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A short Ion history

- Memory allocation framework originally written by Rebecca Schultz Zavin at Google for Android
- Designed to manage memory pools
- These days, mostly for getting buffers to gralloc, uses dma_buf
Do we still need Ion

- Yes, but in a different way
- Simple wrapper for dma_buf allocations to userspace (kernel?)
- Useful for gralloc and gralloc like frameworks
What happened this last year?

- Ripped out a bunch of code and simplified things
- New allocation interface and ABI
  - Just an ioctl for allocation and querying the heaps
- Patches are pending for update to AOSP
  - Thanks John and Sumit!
Why is Ion still in staging - A B I
Split /dev/ion

- Lots of interest in going from /dev/ion -> /dev/heap1, /dev/heap2
- Patches to review for this
- Question: Discoverability?
The allocation ABI

```c
struct ion_allocation_data {
    __u64 len;
    __u32 heap_id_mask;
    __u32 flags; /* Some people are running out of space? */
    __u32 fd;
    __u32 unused; /* Okay to expand into here? */
};
```
Query ioctl

struct ion_heap_query {
	__u32 cnt; /* Total number of heaps to be copied */
	__u32 reserved0; /* align to 64bits */
	__u64 heaps; /* buffer to be populated */
	__u32 reserved1;
	__u32 reserved2;
};
Questions

- Flags field has 16 bits reserved for vendor usage
- Already running out of space(!)
  - Expand? Tell people to be more clever?
- Need to access internal flags for state
  - New ioctl is_flag_set, returns bool?
New heaps, Old heaps

- Addition of new heaps must have at least one open source user
- Delete old heaps for people to bring back later
Debug accounting

- Memory leaks are painful, how to find out which process is at fault?
  - Someone forgot to close an fd, not surfaceflinger
- Idea: use lsof to show open fds, give dma_buffer unique names
- Enough correlation?
- Other ideas?
Testing

- kselftest integration
- Allocation/free easy to test
- In kernel mapping APIs harder to test
- This is roughly a dma-buf test?
libion

- Currently exists as an AOSP git repo
- Similar to what libdrm provides, wrappers around ioctls
- Okay to just leave in AOSP based on discussion in LPC
Destaging?

- Happening soon but not too soon
- Live under drivers/gpu and work through drm tree?
Any other discussion?