

Single Address Space OS (SASOS)

- Allocating address space at 1 GB/s (without reuse) will last for 500 years in a 64 bit architecture
 - Few seconds in a 32 bit architecture
- Now you don't have to create separate address spaces for each process - all processes can share a single address space
- Opal - separate address space from protection domain
 - Address space is set of virtual bindings
 - Protection domain defines what is accessible
 - Motivating example: Boeing which uses many parts to design a complex system



OS classification

- Unprotected OS - e.g. DOS
 - Cooperation is simple, efficient but fragile
- Private address space OS - e.g. UNIX, XP etc
 - Cooperation via communication primitives
- SASOS - e.g. Opal
 - Uniformly addresses global VM
 - Pure protection domain
 - Segment grain allocation, sharing and management of VM
 - Uniform naming and accessing control using capabilities



Issues

- Virtual contiguity and segment growth
 - How do you grow “arrays”
- Memory reclamation and address recycling
 - If no process has access to a segment then reclaim
 - Dangling pointers (to the old segment) are a problem
- Process creation by cloning address spaces (fork)
 - Cannot implement fork() abstraction
- Address remapping and copy on write

- Programs have to be careful in accessing private, temporary data or global data

