Memory Disaggregation
For Expansion and Sharing in Blade Servers
Motivation

Fig: Memory Stranding
Motivation

Fig: Memory stranding
Fig: Distributed Shared Memory
Approaches to building Memory Disaggregation

1. Blade Servers
2. RDMA
3. CXL
Memory Disaggregation with Blade Servers
Fig: Blade Server Implementation of Shared Memory
Fig: Blade Server Implementation of Shared Memory
Re-Allocation Strategies

**Approach 1**
- Compute Blade
- Disk
- DSM
- Page to deallocate

**Approach 2**
- Guest OS Memory
- Swap
- Disk
PCle Page Level Memory Access

*Fig*: Blade Server Implementation of Shared Memory
**PCIe Fine Grain Memory Access**

*Fig*: Blade Server Implementation of Shared Memory
Figure: Speedup with Blade Server Memory Sharing
RDMA for Disaggregation

Fig: RDMA remote memory access
DSM Challenges

- Durability
- Concurrency Control
- Cache coherence
- Buffer Management
- Index Design