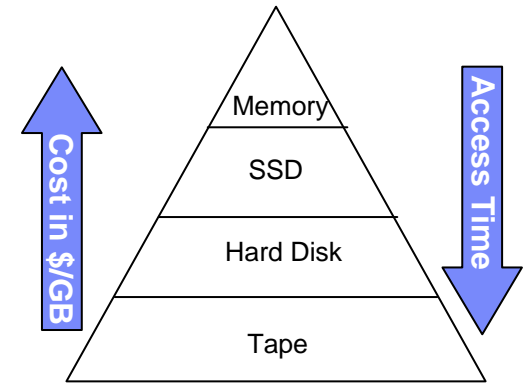
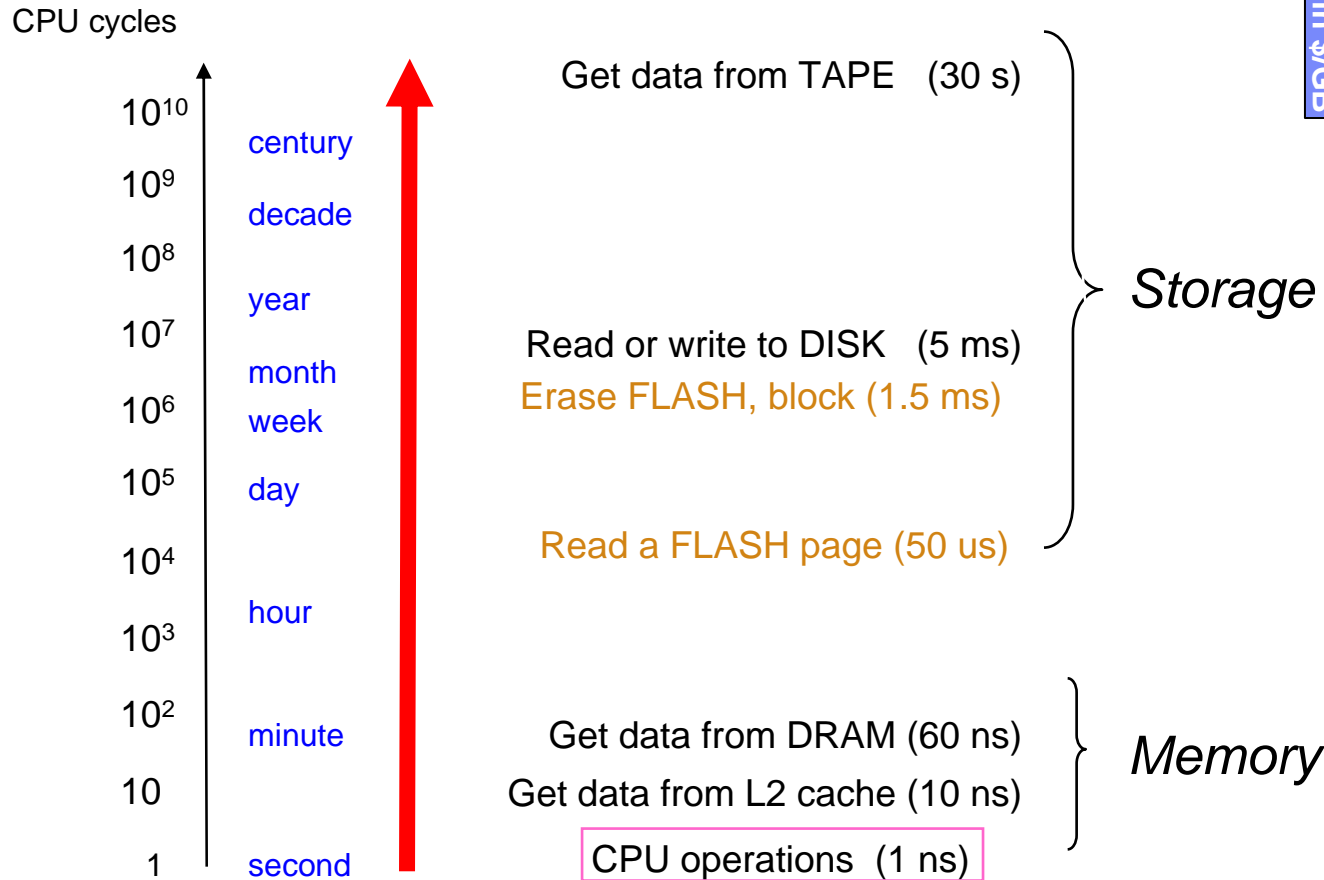
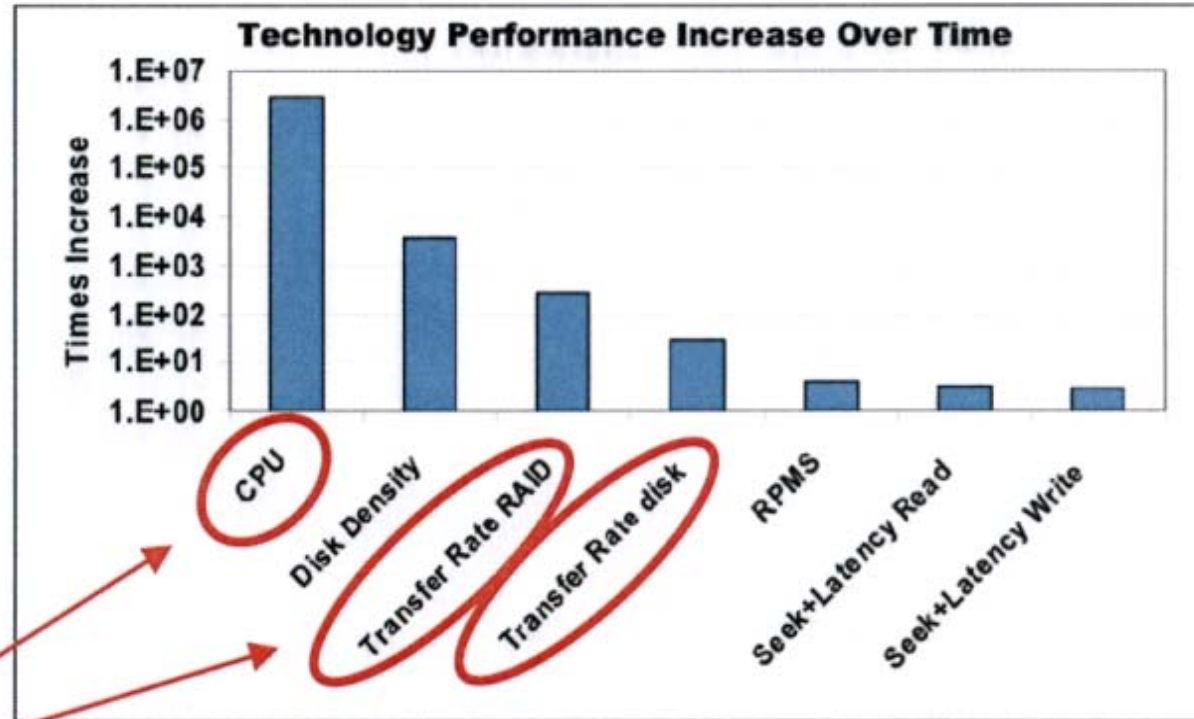


Memory/Storage Stack Latency and Cost



Performance Increases from 1977 - 2006



At least 4 orders of magnitude difference between improvements in speed of CPU and disk transfer rates

- Disk density has grown at same pace as processor speed
- Disk data transfer rates have grown modestly
- Disk access times have hardly improved

Source: High End Computing Revitalization Task Force (HEC-RFT), Inter Agency Working Group (HEC-IWG) File Systems and I/O Research Workshop