Parallel Rendering

Molnar, Cox, Ellsworth, and Fuchs. "A Sorting Classification of Parallel Rendering." *IEEE Computer Graphics and Applications*. July, 1994.

Why Parallelism

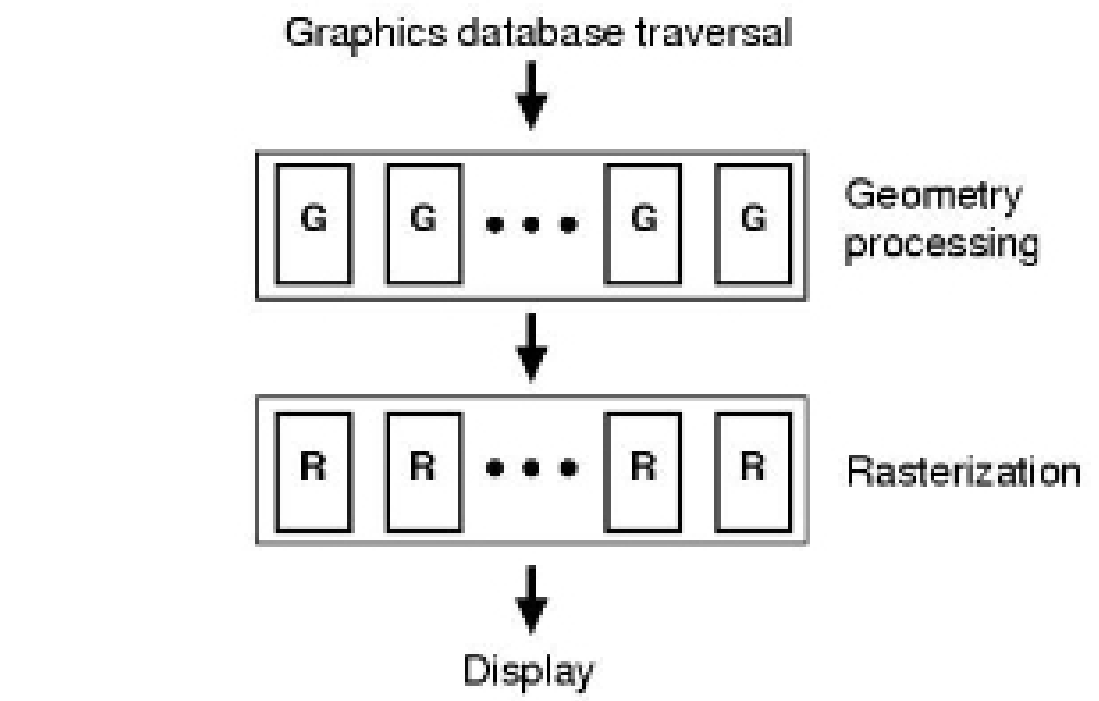
Applications need:

- **High frame rates**
- **High resolution**
- **Large geometric models**
- **Stereo**
- **Antialiasing**
- **etc.**

Performance implications:

- **Hundreds of MFLOPS compute power**
- **Gigabytes per second memory bandwidth**

Stages of Parallelism



Processing Tasks

Geometry Processors

- Each processor gets a subset of primitives
- Transformation
- (Lighting)
- Set-up for Rasterization

Rasterization Processors

- Each processor gets a subset of pixels
- Visibility computation
- Shading

Rendering as Sorting

- Primitives may lie anywhere on or off screen
- Determine effect of each primitive on each pixel
- Primitives are “sorted” onto screen
- Sorting affects distribution of data on geometry and rasterization processors

Primitives in Screen-space Regions