L9: Performance

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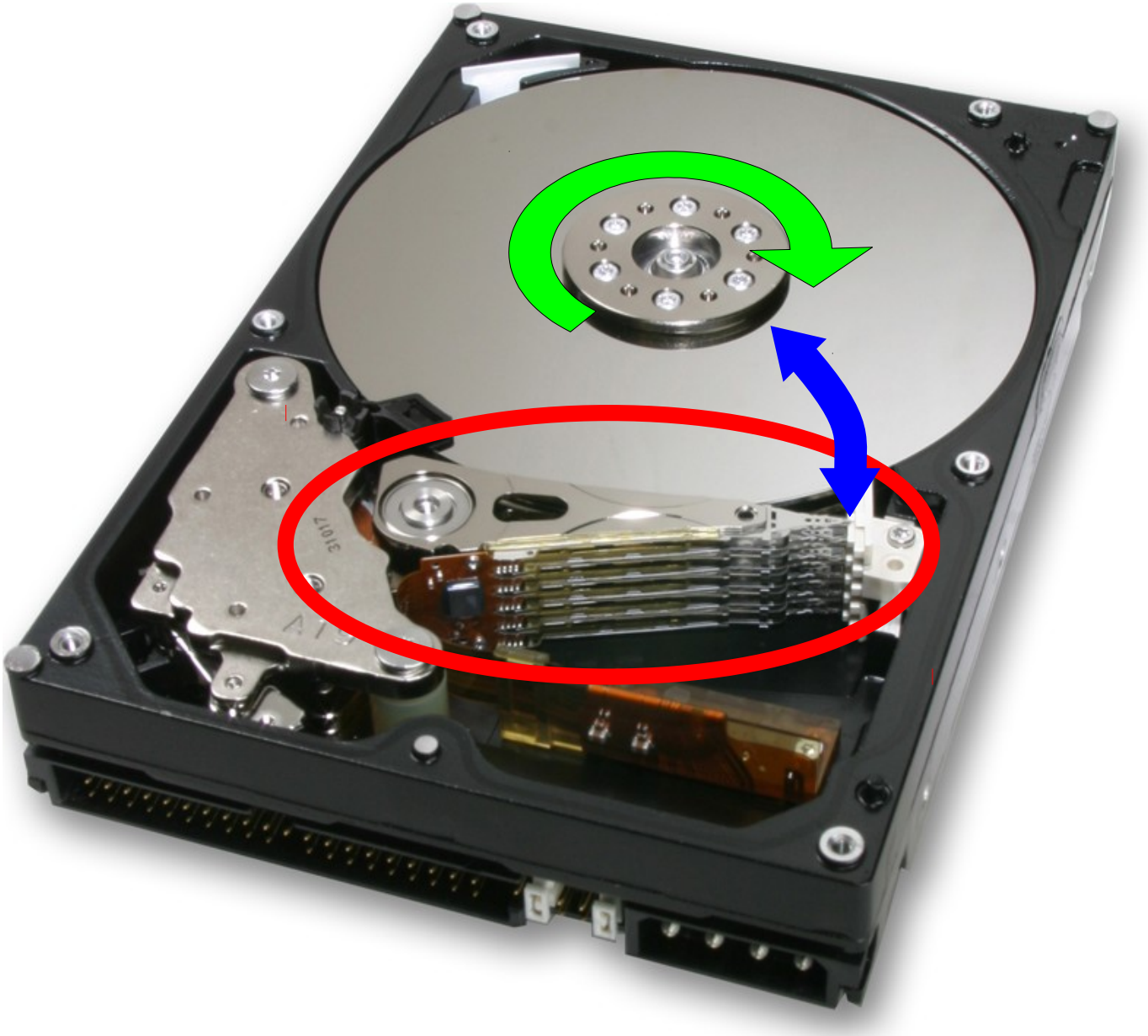
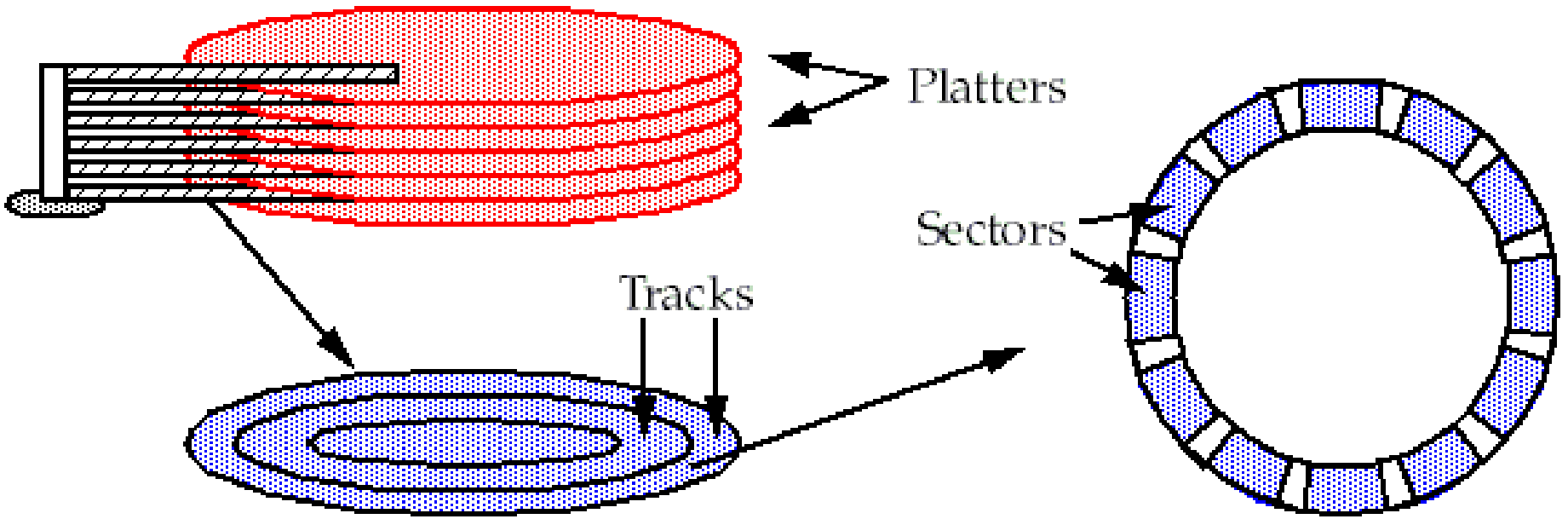
Simple server

```
while True:
    wait for request
    data = read(name)
    compute
    send response
```

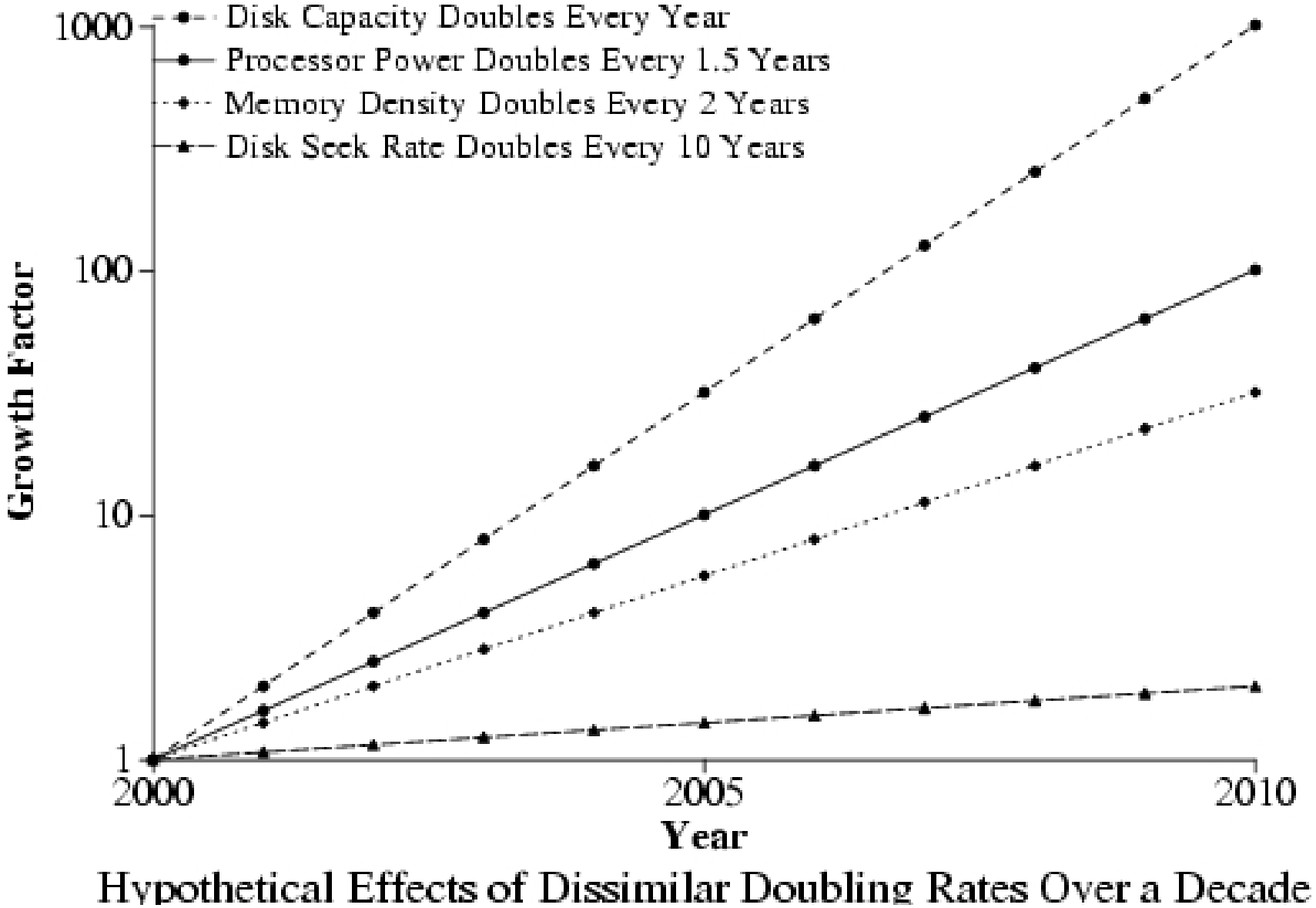
Hitachi 7K400



Disk sectors



I/O bottleneck



Hypothetical Effects of Dissimilar Doubling Rates Over a Decade

Important numbers

- Latency:

  0.000001 msec: one instruction (1ns)
  0.0001 msec: one DRAM load (100ns)
  0.1 msec: LAN network
  10 msec: random disk I/O
  25 msec: east coast → west coast (fiber)

- Throughput:

  10,000 MB/sec: DRAM
  1,000 MB/sec: LAN (or 100 MB/sec)
  100 MB/sec: sequential disk (or 500 MB/sec)
  1 MB/sec: random disk