

Storage:

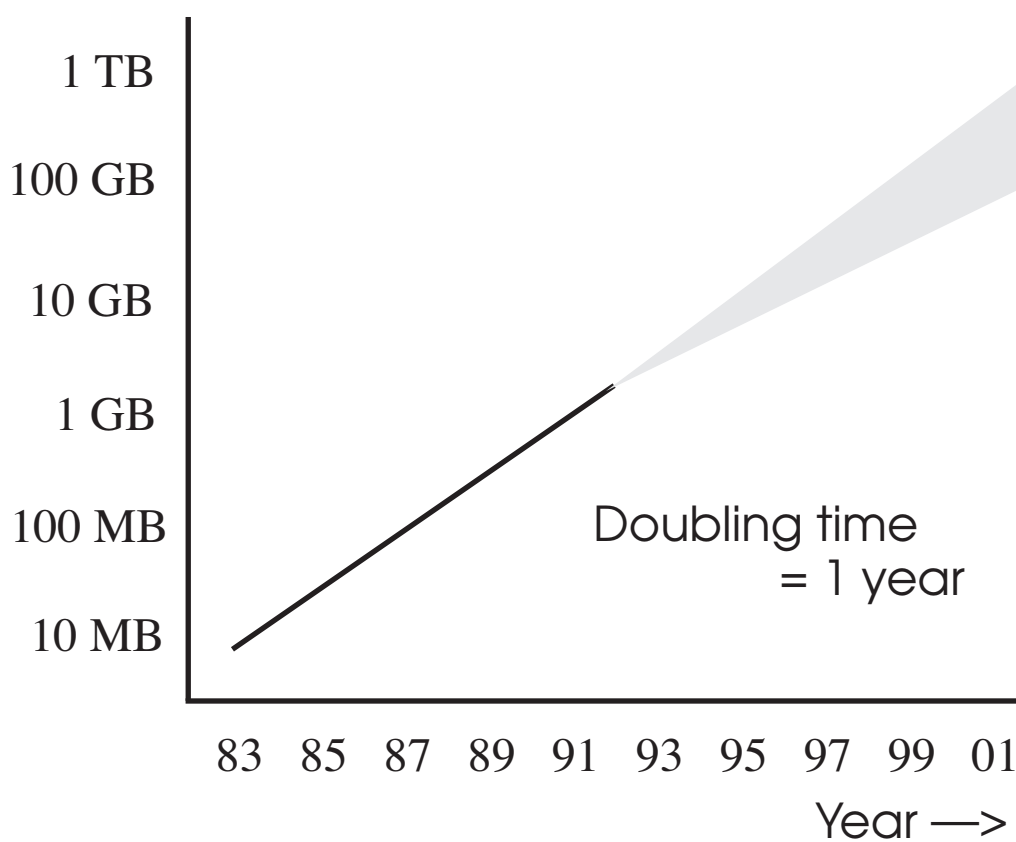
The
Unnoticed
Revolution

Jerome H. Saltzer

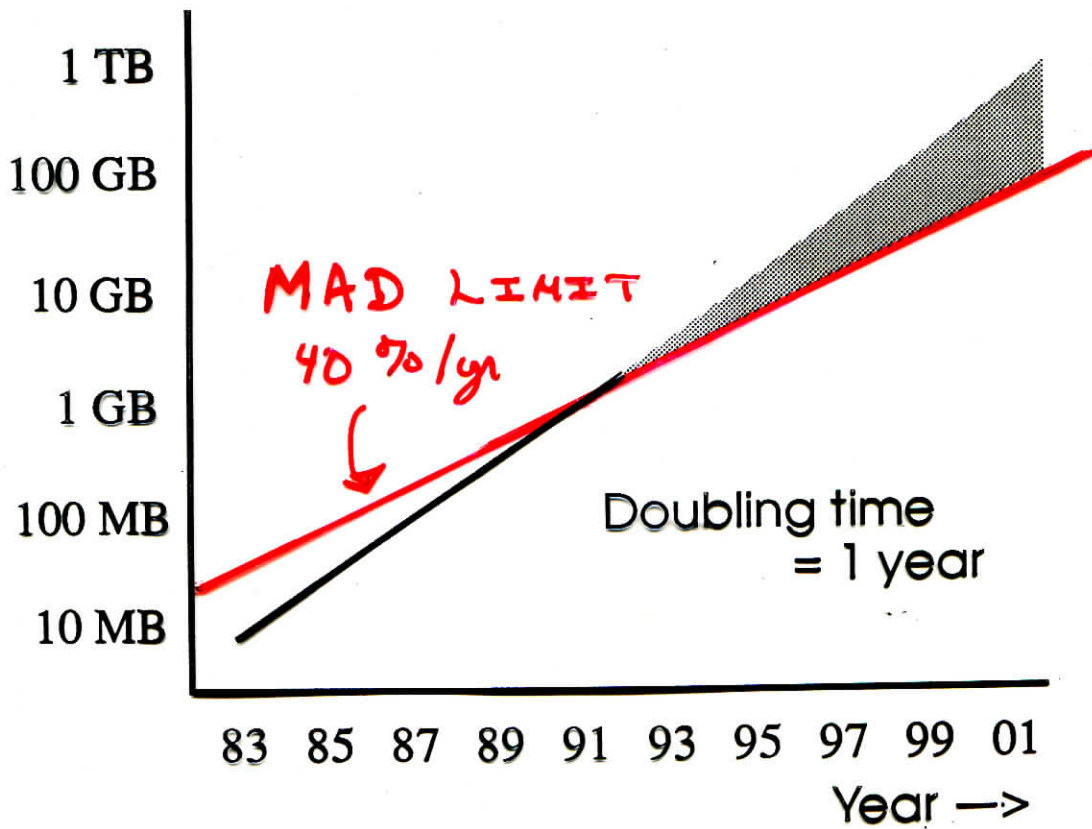
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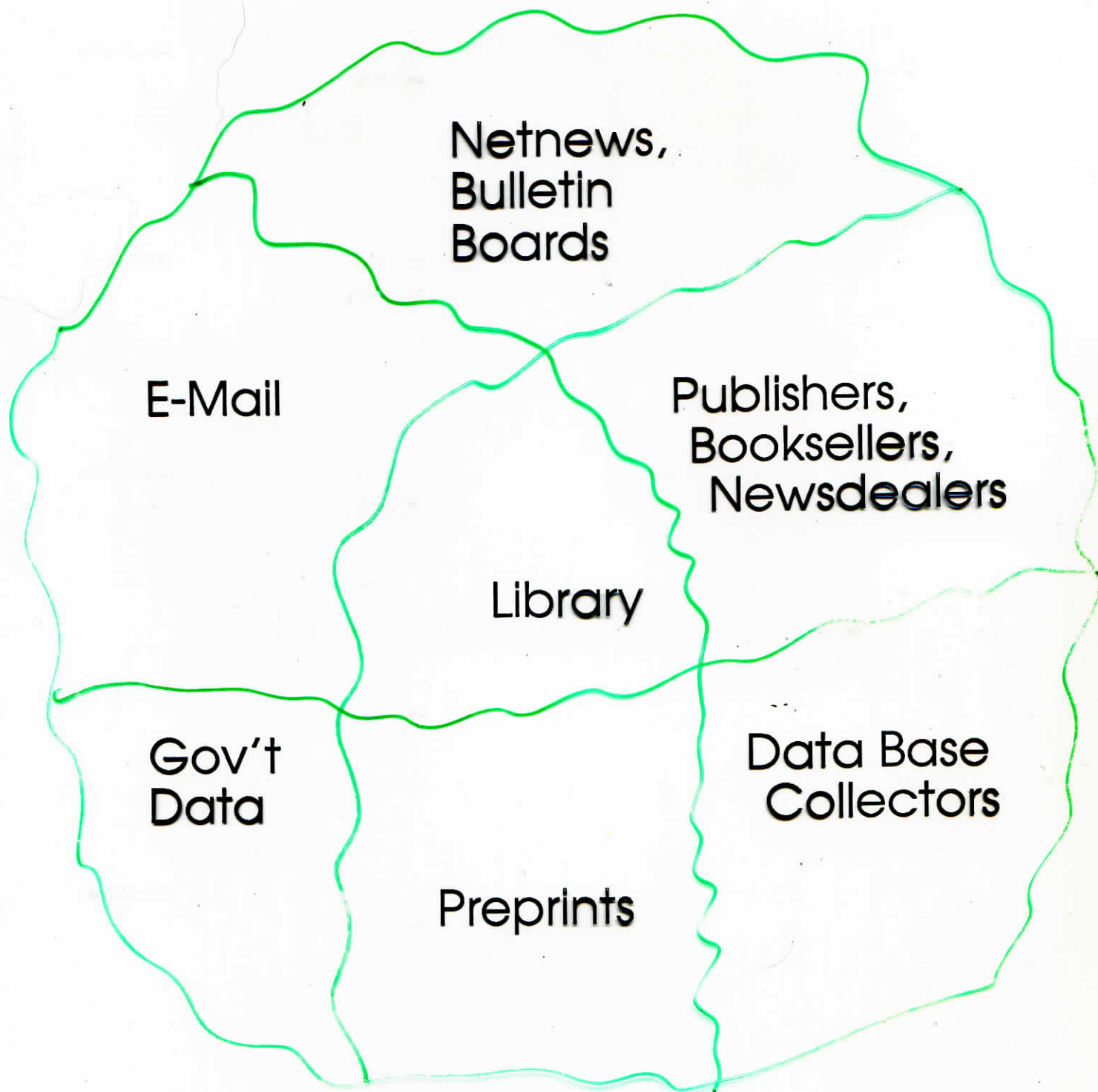
Disk Storage Capacity for \$2500.



Disk Storage Capacity for \$2500.



Find the Boundaries



Size, by Decade:

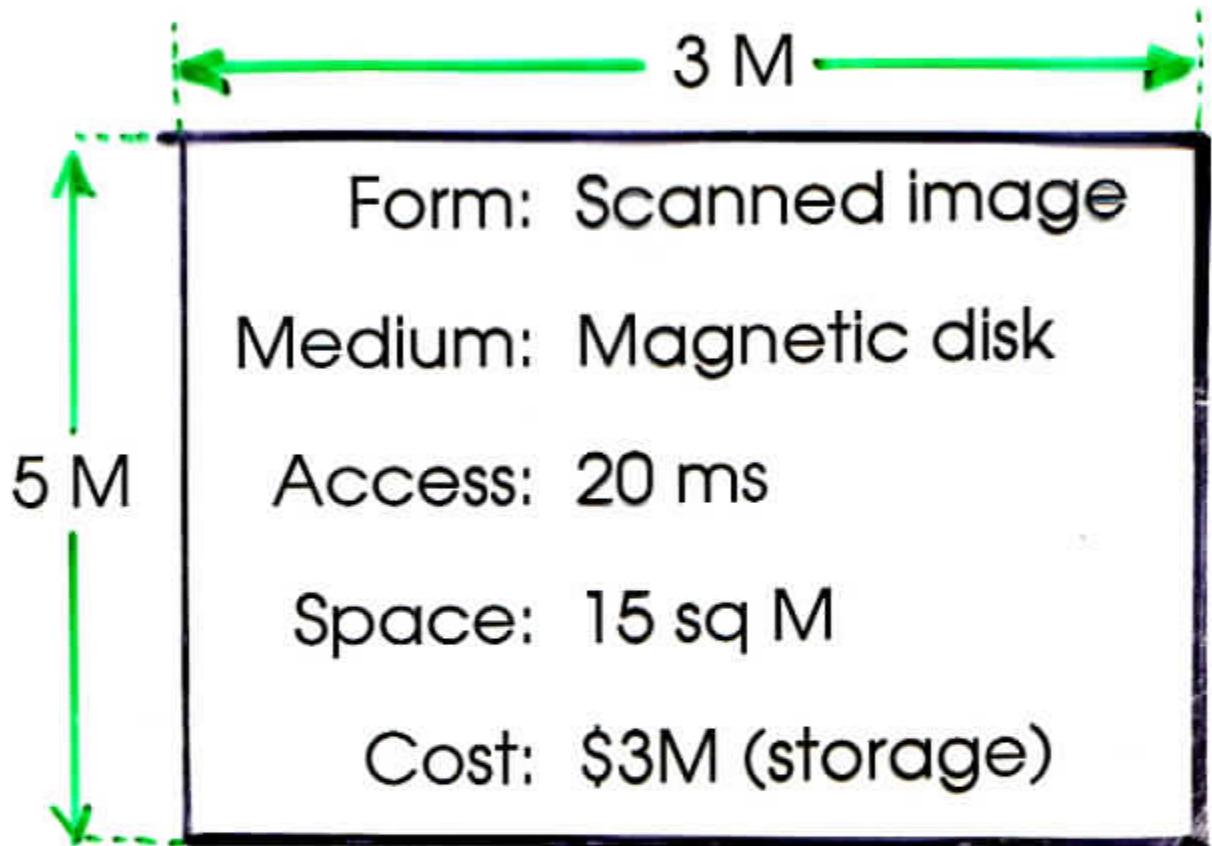
1983:	PC	Time-Sharing Service
RAM	256 KB	8 MB
Disk	5/10 MB	.3/3 GB
1993:	Powerbook	Storage Service
RAM	8/16 MB	.5/1 GB
Disk	80/160 MB	10/100 GB
2003:	PDA	Information Service
RAM	400/800 MB	50/100 GB
Disk	2/4 GB	1/10 TB

The Driving Forces

$$\frac{\text{Cost}(\text{Image} - \text{Disk})}{\text{Cost}(\text{Paper})} = \begin{bmatrix} 10 (1993) \\ 1.0 (1998) \\ 0.1 (2003) \end{bmatrix}$$

$$\frac{\text{Space}(\text{Image} - \text{Disk})}{\text{Space}(\text{Paper})} = \begin{bmatrix} 0.1 (1993) \\ 0.01 (1998) \\ 0.001 (2003) \end{bmatrix}$$

1 MegaBook Library in 1999



Slowly-Changing Storage Ratios

(1993 values)



$$\frac{\text{RAM}}{\text{Disk}} = \frac{25 (\text{Dollars/MB})}{1 (\text{Dollars/MB})} = 25$$

$$\frac{\text{Image}}{\text{ASCII}} = \frac{100 (\text{KB/Page})}{4 (\text{KB/Page})} = 25$$

Indexes  RAM

A Technology-Driven Vision:

1. You can browse through any library holding from your office.
2. You can click on a reference and expect it to appear in an adjacent window.

The Action...

Discovery }
Alerting } Finding Things

Mobility + Information Access
= Killer Applications

Boundaries