

XVII_Client side

Accesso con proxy cache Add of a proxy

Parameters:

- Phit: fraction of reqs can served front the proxy
 HitCPUtime: CPU time needed to process req hit
 MissCPUtime: " ", steps:
- process req
 - ask req to WS
 - Store doc
 - Replace doc
 - Send doc to client
- Disk-time: disk time at the cache proxy server

$$D_{xx}^p = (1 - \text{Phit}) D_{xx}$$

Accesso ad un server senza proxy. Classic connection client-server

Input parameters:

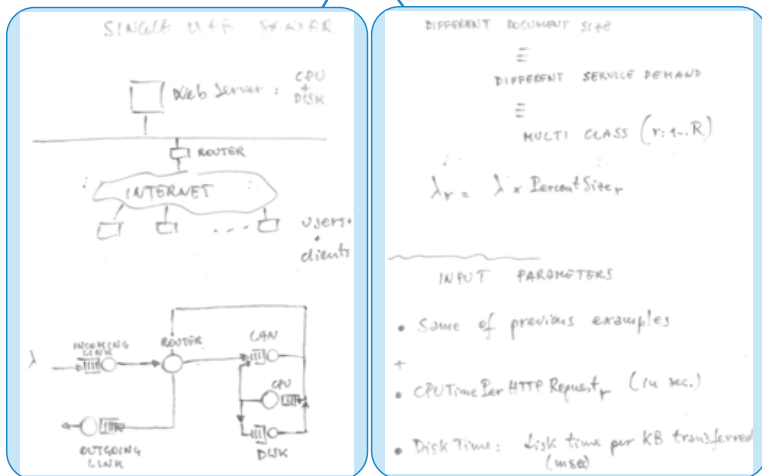
- LANbandwidth
 MaxPDU
 FrameOvhd
 Router latency
 LinkBandwidth
 InternetDelayRTT
 InternetDataRate
 BrowserRate
 #Clients
 PercentActive
 AvgSizeHTTPRequest
 DocumentRequested:
 - R: number of cat.
 - DocumentSize r
 PercentSize r
 DocumentSize : sum of docrsizes

Calcolo delle Service Demand

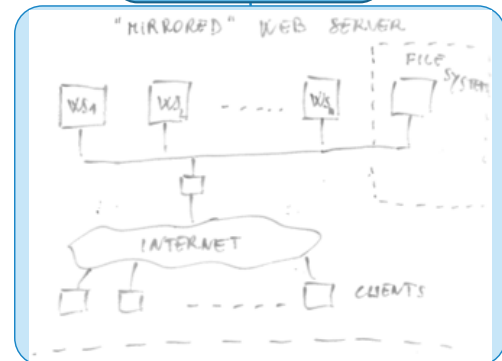
- Service demand at queue 2: LAN
- Service demand at queue 3: Router
- Service demand at queue 4: Outgoing link
- Service demand at queue 5: ISP, Internet, WebSites
- Service demand at queue 6: Incoming link

XVIII_Server side

Single Web Server

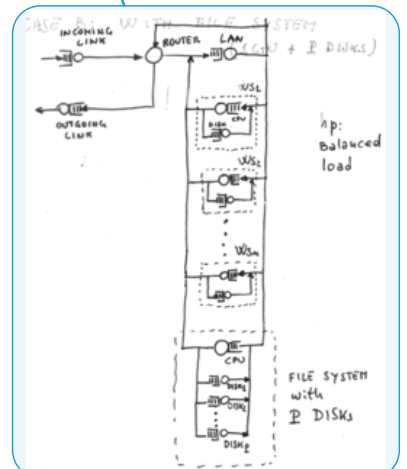
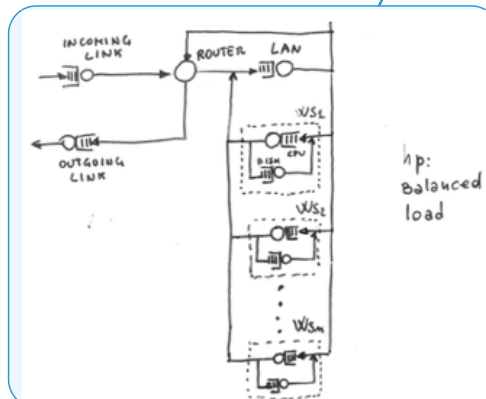


Mirrored Web Servers



Without file system

With file system



calculate service demands

$$D_{CPU,r} = \text{CPUTimePerHTTPRequest}_r + \frac{f(\bar{n}) \times \text{CPUOverhead}}{\bar{n}}$$

$$\bar{n} = \sum_{r=1}^R (m_{CPU,r} + n_{disk,r})$$

$$D_{disk,r} = \text{DocumentSize}_r \times \text{DiskTime}/1000$$

$$\text{CPUTimePerHTTPRequest}_r$$

intrinseca service demand

$$f(\bar{n}) = \text{Coeff}_{load}$$

load-dependent service demand

- protocol type
- message size
- if all simultaneous connections
- queuing system considered
- cache hit/miss management
- error handling
- document compression

\bar{n} è funzione dei flussi λ e ρ_{CPU} che non si conoscono al momento della costruzione del modello

APPROCCIO ITERATIVO

- 1) Risolvere il modello multiclasse "aperto", assumendo $\text{CPUOverhead} = 0$ e ottenere \bar{n}
- 2) Ricalcolare il nuovo valore di $D_{CPU,r}$
 $D_{CPU,r} = \text{CPUTimePerHTTPRequest}_r + \frac{f(\bar{n}) \times \text{CPUOverhead}}{\bar{n}}$
- 3) Risolvere di nuovo il modello usando il nuovo valore di $D_{CPU,r}$ e ottenere un nuovo valore di \bar{n}
- 4) Calcolare la differenza tra i due valori di \bar{n} , se più piccolo di un certo valore (p.e. 10^{-5}) fine altrimenti: si ritorna al passo 2)

CASE A: WITHOUT FILE SYSTEM

$$D_{CPU,r}^m = \frac{D_{CPU,r}}{h}$$

$$D_{disk,r}^m = \frac{D_{disk,r}}{n}$$

CASE B: WITH FILE SYSTEM (1 CPU + P disks)

$$D_{LAN,r}^m = \text{NetworkTime}(\text{AvgSizeHTTPRequest}_r, \text{LANBandwidth})$$

$$+ 2 \text{ NetworkTime}(\text{AvgSizeHTTPRequest}_r, \text{LANBandwidth})$$

$$+ 5 \text{ NetworkTime}(\text{AvgSizeHTTPRequest}_r, \text{LANBandwidth})$$

$$D_{FCPU,r} = \text{DocumentSize}_r \times \text{CPUTimePerFSReq}_r$$

(time x KB access)

$$D_{disk,r} = \frac{\text{DocumentSize}_r \times \text{DiskTime}/1000}{P}$$