

Store

AFSv1

TestAuth

49.1 AFSv1

&+ž#	38E h#
TestAuth	
GetFileStat	
Fetch	
Store	
SetFileStat	
ListDir	

&+ž\$ #

AFS
AFS

measurement

AFSv1

Patterson

David Patterson RISC RAID

Patterson

1 Fetch Store

/home/remzi/notes.txt

home home remzi

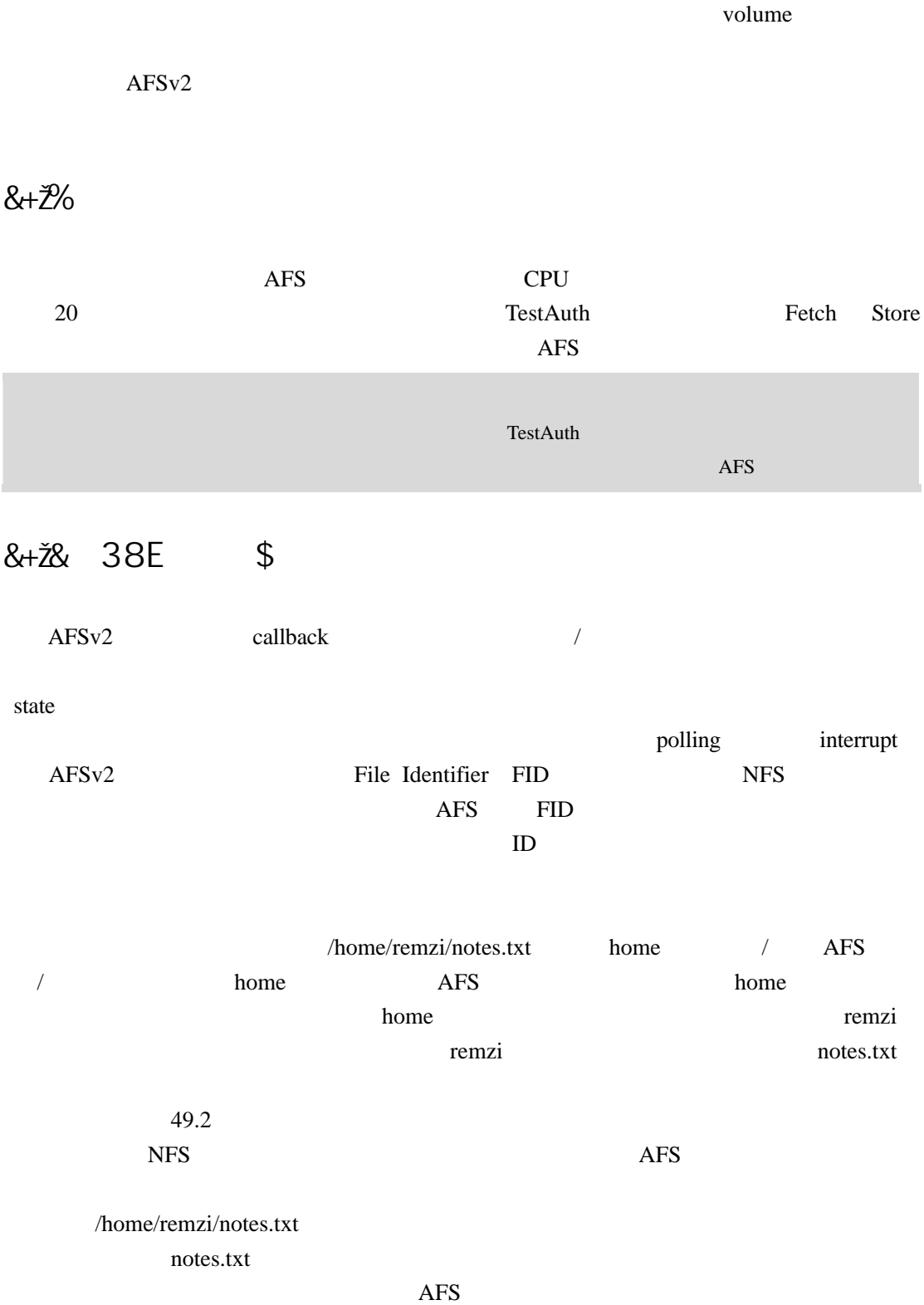
AFS

CPU

1 TestAuth NFS GETATTR

AFSv1 TestAuth

AFSv1

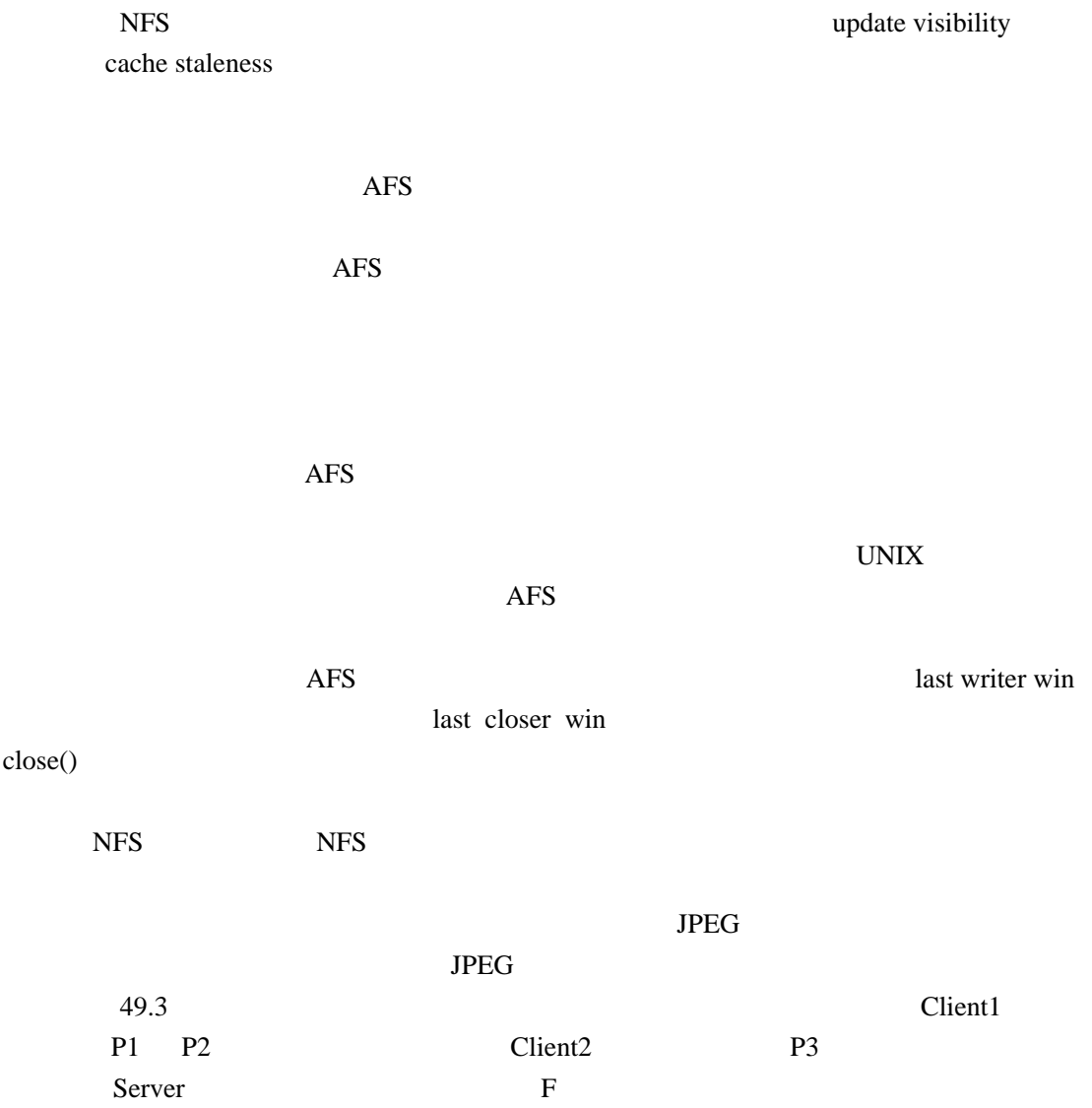


&+Z\$	
(C1)	
fd = open(/home/remzi/notes.txt); Fetch (home FID, remzi)	
	Fetch home remzi remzi callback(C1) remzi FID
Fetch remzi remzi Fetch (remzi FID, notes.txt)	
	Fetch remzi notes.txt notes.txt callback(C1) notes.txt FID
Fetch notes.txt notes.txt open() notes.txt	
read(fd, buffer, MAX); read()	
close(fd); close()	
fd = open(/home/remzi/notes.txt); Foreach dir (home, remzi) if (callback(dir) == VALID) lookup(dir) else Fetch (if (callback(notes.txt) == VALID) open return else Fetch () then open return fd	

file-level locking

48

&+Z



&+Z%

P1	Client1 P2	Cache	Client2 P3	Cache	Server Disk	
open(F)						
write(A)		A				
close()		A			A	

C1

C1

heartbeat

NFS

&+Z)

38Eh\$

AFSv2

50

20

Store

NFS

AFS

49.4

&+Z&		38E	@8E
	NFS	AFS	AFS/NFS
1	$N_s \frac{1}{2} \text{net}$	$N_s \frac{1}{2} \text{net}$	1
2	$N_s \frac{1}{2} \text{mem}$	$N_s \frac{1}{2} \text{mem}$	1
3	$N_m \frac{1}{2} \text{net}$	$N_m \frac{1}{2} \text{net}$	1
4	$N_m \frac{1}{2} \text{mem}$	$N_m \frac{1}{2} \text{mem}$	1
5	$N_L \frac{1}{2} \text{net}$	$N_L \frac{1}{2} \text{net}$	1
6	$N_L \frac{1}{2} \text{net}$	$N_L \frac{1}{2} \text{disk}$	Ldisk / Lnet
7	Lnet	$N_L \frac{1}{2} \text{net}$	N_L
8	$N_s \frac{1}{2} \text{net}$	$N_s \frac{1}{2} \text{net}$	1
9	$N_L \frac{1}{2} \text{net}$	$N_L \frac{1}{2} \text{net}$	1
10	$N_L \frac{1}{2} \text{net}$	$2 \frac{1}{2} N_L \frac{1}{2} \text{net}$	2
11	Lnet	$2 \frac{1}{2} N_L \frac{1}{2} \text{net}$	$2 \frac{1}{2} N_L$

N_s

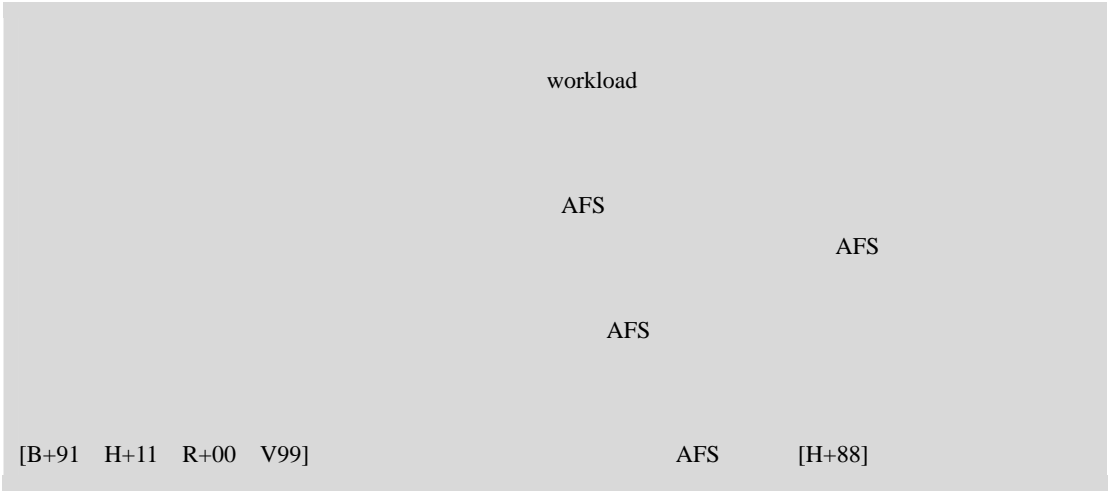
N_M

N_L

&+Ž* 38E

Berkeley FFS AFS
AFS

NFS NFS



AFS
NFS
AFS AFS
UNIX NFS
AFS
AFS

&+Ž+

AFS NFS AFS
AFS AFS
NFS AFS
AFS NFS

Mary Baker, John Hartman, Martin Kupfer, Ken Shirriff, John Ousterhout SOSP 91, Pacific Grove, California, October 1991

[H+11] A File is Not a File: Understanding the I/O Behavior of Apple Desktop Applications Tyler Harter, Chris Dragga, Michael Vaughn,

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[R+00] A Comparison of File System Workloads Drew Roselli, Jacob R. Lorch, Thomas E. Anderson

Baker [B+91]

M Satyanarayanan, J.H. Howard, D.A. Nichols, R.N. Sidebotham, A. Spector, M.J. West SOSP 85, Orcas Island, Washington, December 1985

[V99] File system usage in Windows NT 4.0 Werner Vogels

SOSP '99, Kiawah Island Resort, South Carolina, December 1999

UNIX

afs.py

AFS

Andrew

README

1
-s -f
-C -r 0 1
-n 2
2 AFS
-d 3
-c
3
-c -d 7
4 -A oal:w1:c1,oal:r1:c1
1 a
1 1 0
5 -A oal:w1:c1,oal:r1:c1
-S 01, -S 100011, -S 011100
1
6 -A oal:w1:c1,oal:w1:c1
-S 011100 -S 010011