

Kiwi: Implementing a Secure Network File System Using HTTPS



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Kiwi Project <<http://kiwi.stanford.edu/>> **Slide #1**



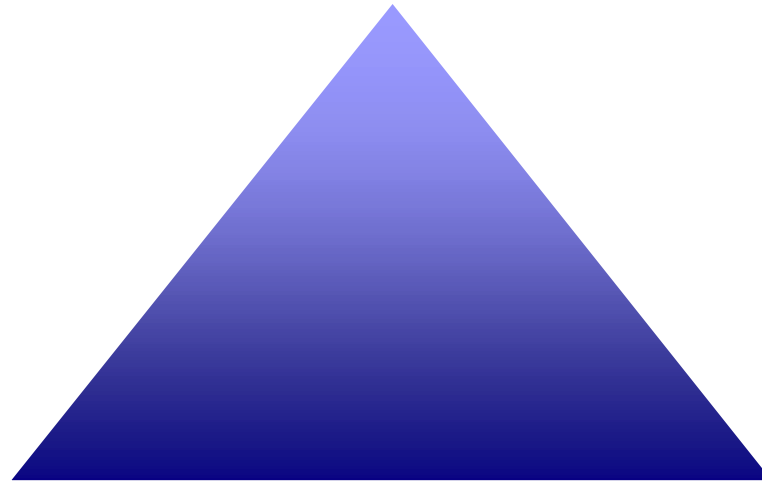
Why Another Filesystem?

ext2 NTFS MFS NFS AVFS PerlFS
UDF FAT CFS AFS wrapfs
JFS CryptFS Ficus
ISO9660 GPFS DFS
ADFS SFS CIFS Echo userfs NASD
BFS XFS SFS userfs NASD
reiserfs ECFS vs3fs Coda
JFFS UFS EFS GFS Intermezzo
CramFS FFS StegFS GFS
HTFS CSFS NCP xFS wvfs Truffles
HPFS HFS rfs HTFS CSFS NCP xFS OceanStore
EFS LFS TCFS UFO ovlfs



Design Goals Behind Kiwi

Secure File Access
From Anywhere



Simplicity of
Development and Use

Scalable to Support
Global File Access



Why HTTP?

28,125,284 web servers

<http://www.netcraft.com/survey/>

forecast 136 million users in 2002

<http://www.infotechrends.com/favorites/99353027.htm>

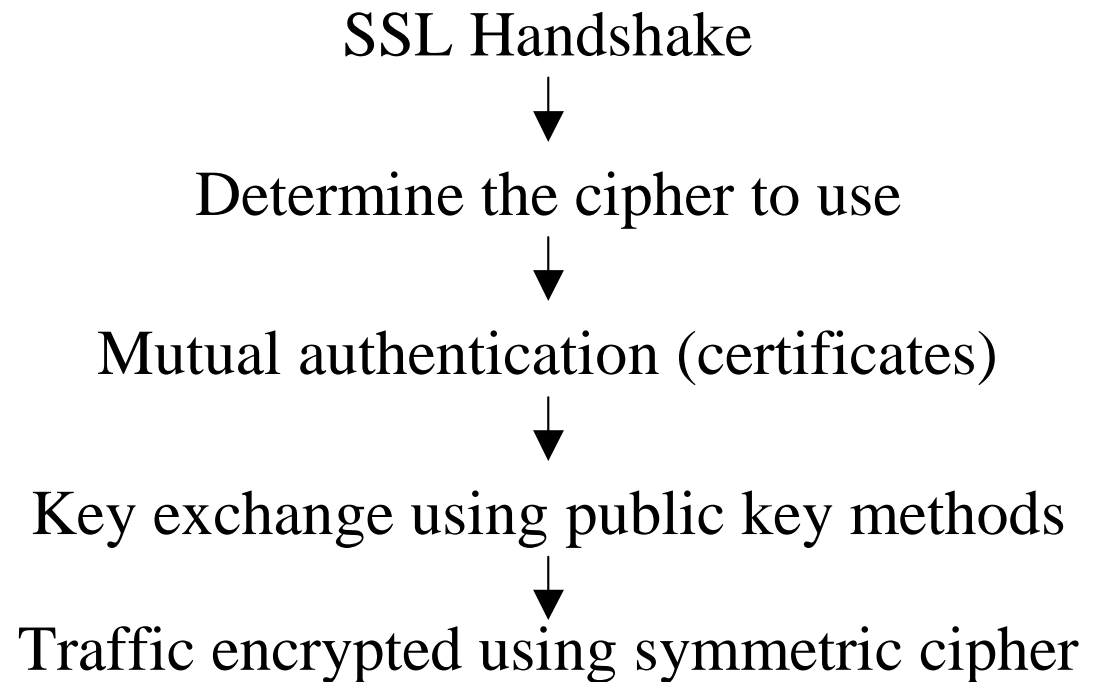
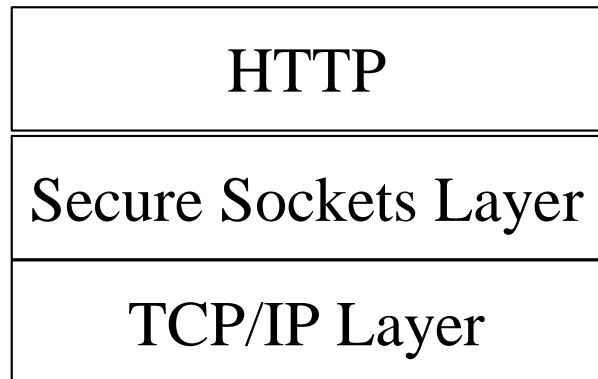
1,346,966,000 web pages indexed

<http://www.google.com/>

- Standard
- Extensible
- Scalable
- Existing code!



Securing The Connection With SSL



Enhanced File Operations With WebDAV

Web-based Distributed Authoring
and Versioning Protocol

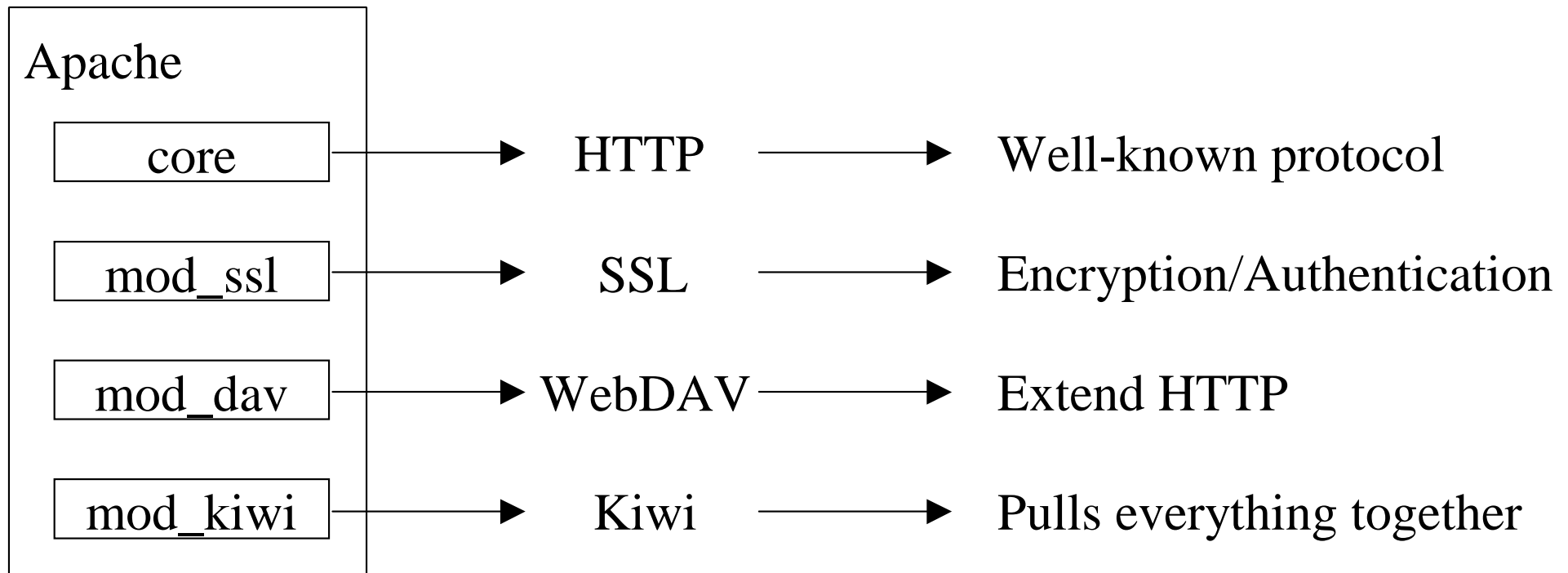
HTTP

GET
PUT
POST

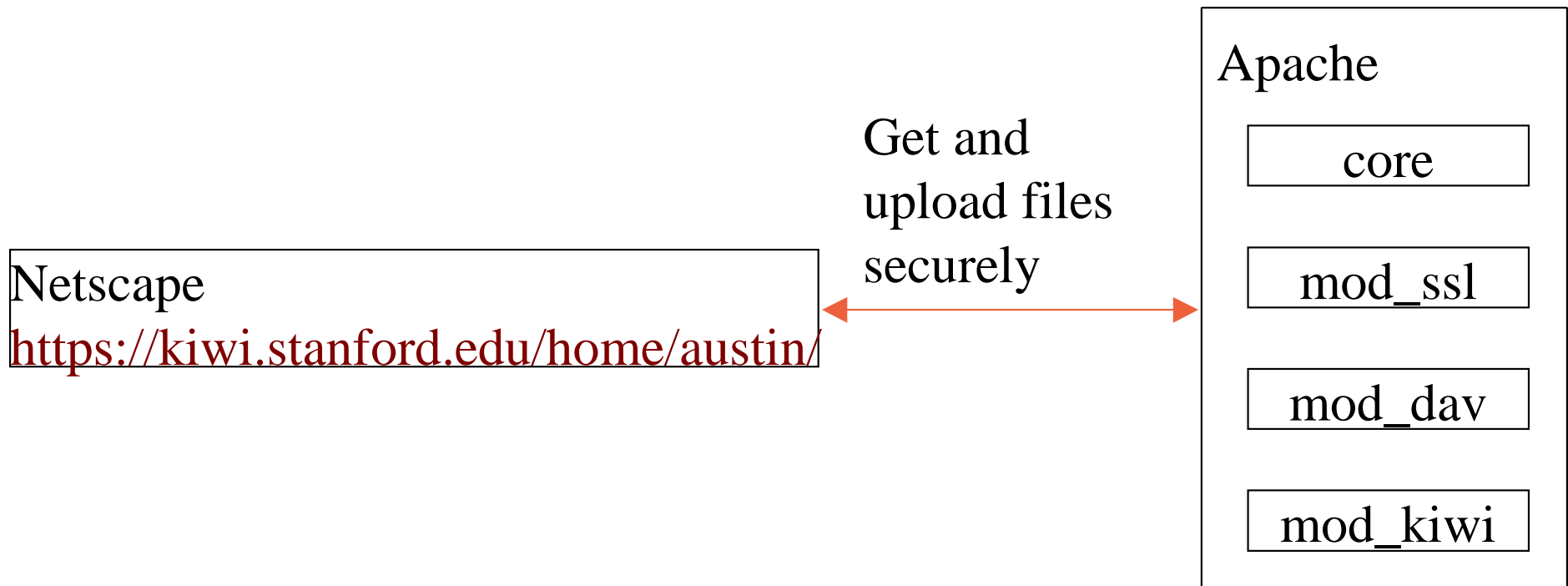
PROPFIND
PROPPATCH
MKCOL
DELETE
COPY
MOVE
LOCK
UNLOCK



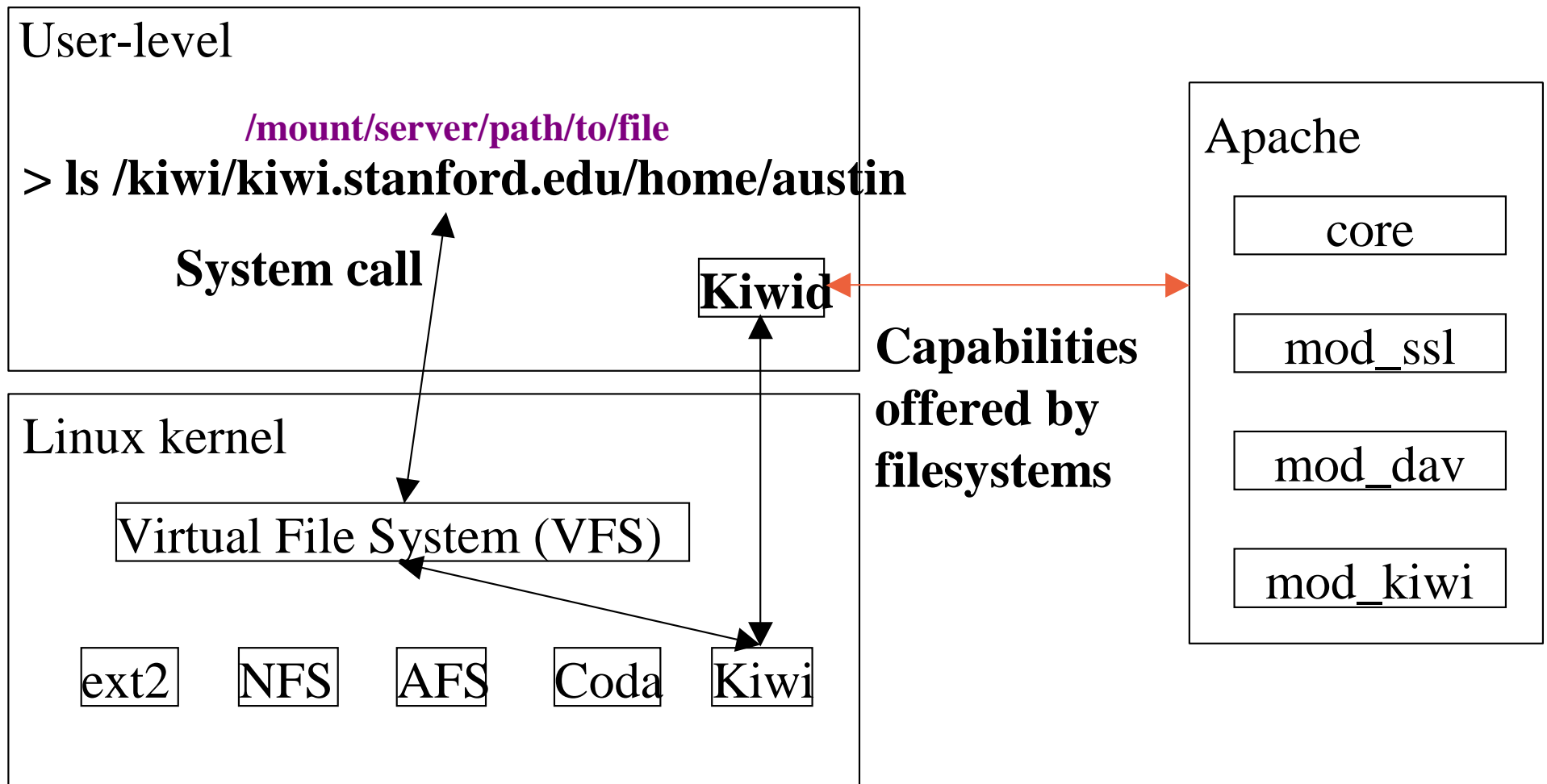
Kiwi Server Built From Existing Components



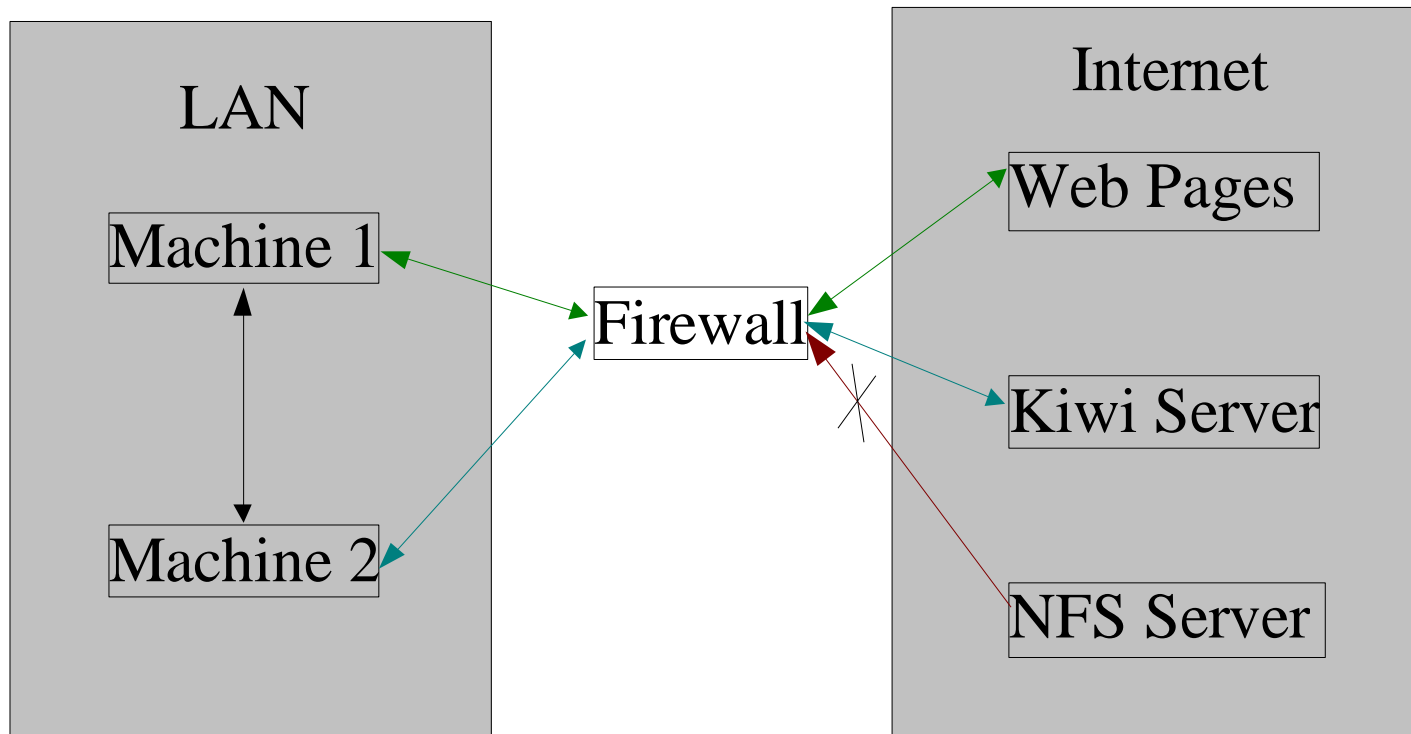
File Access With Web Browser



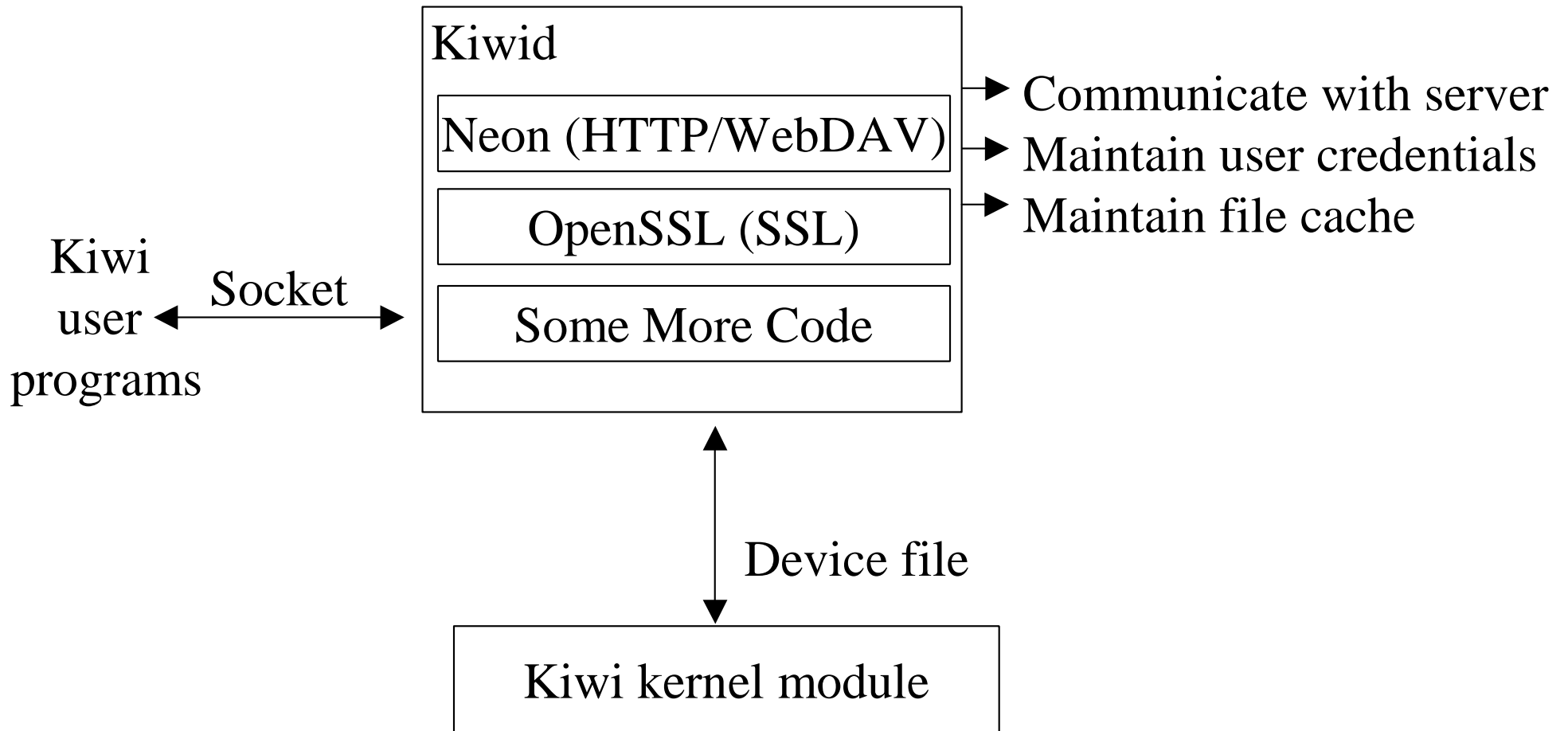
File Access With Linux Filesystem



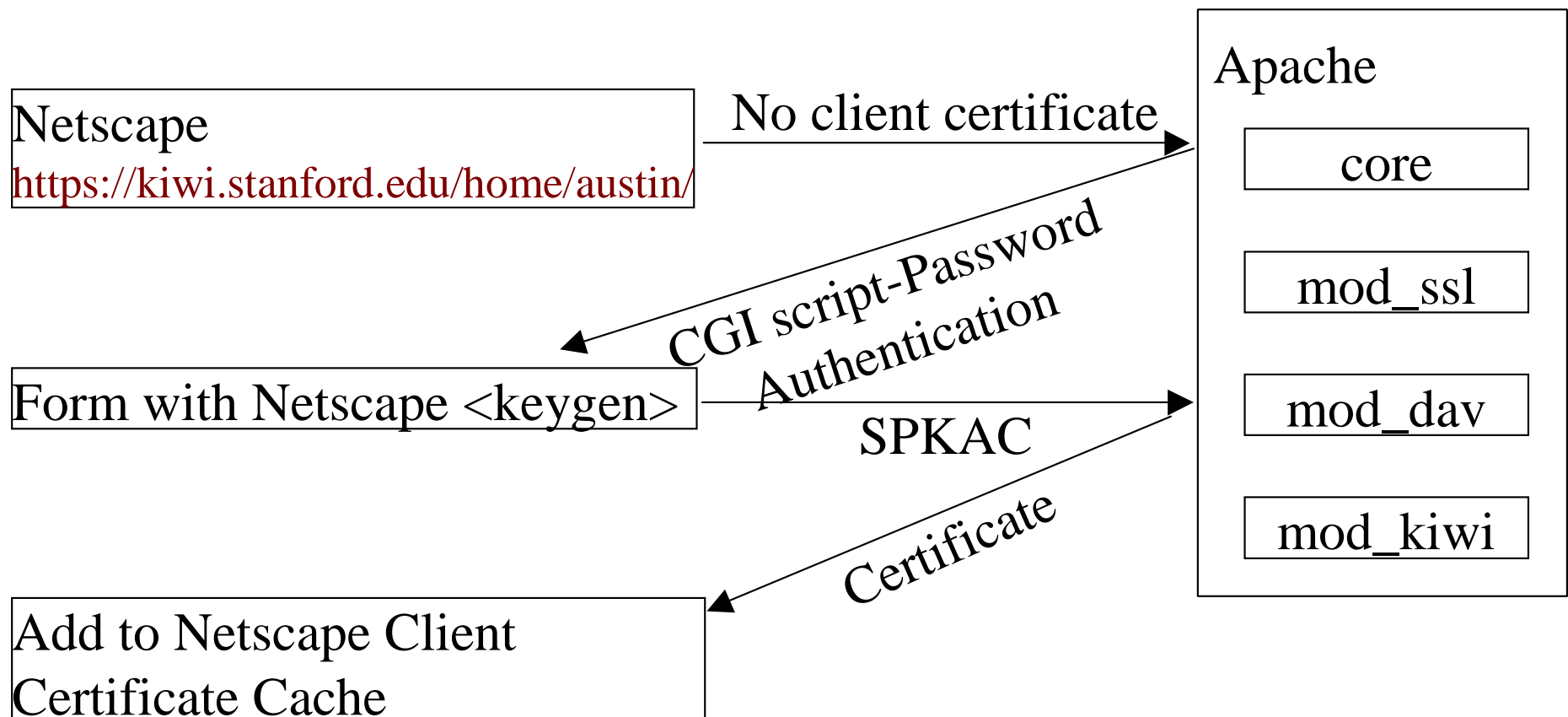
File Access Through Firewalls



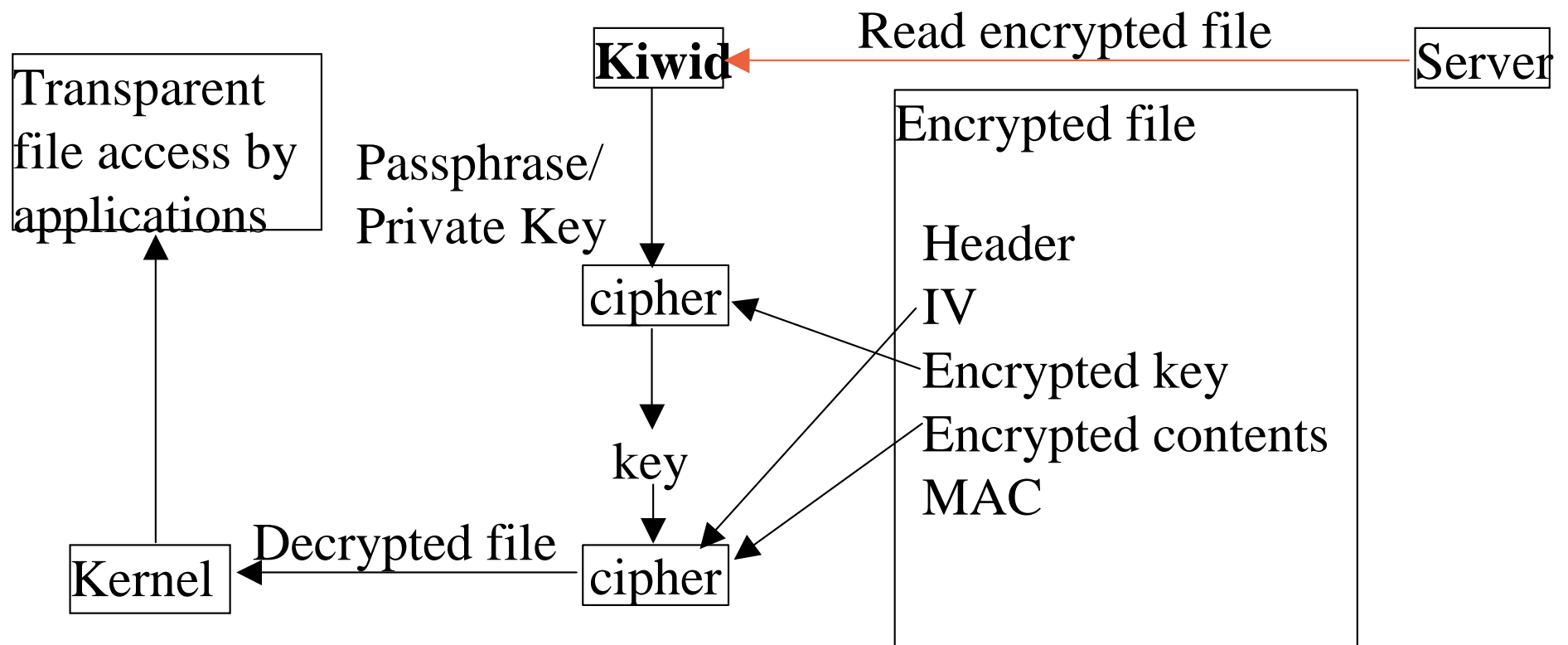
Kiwi Linux Client Implementation



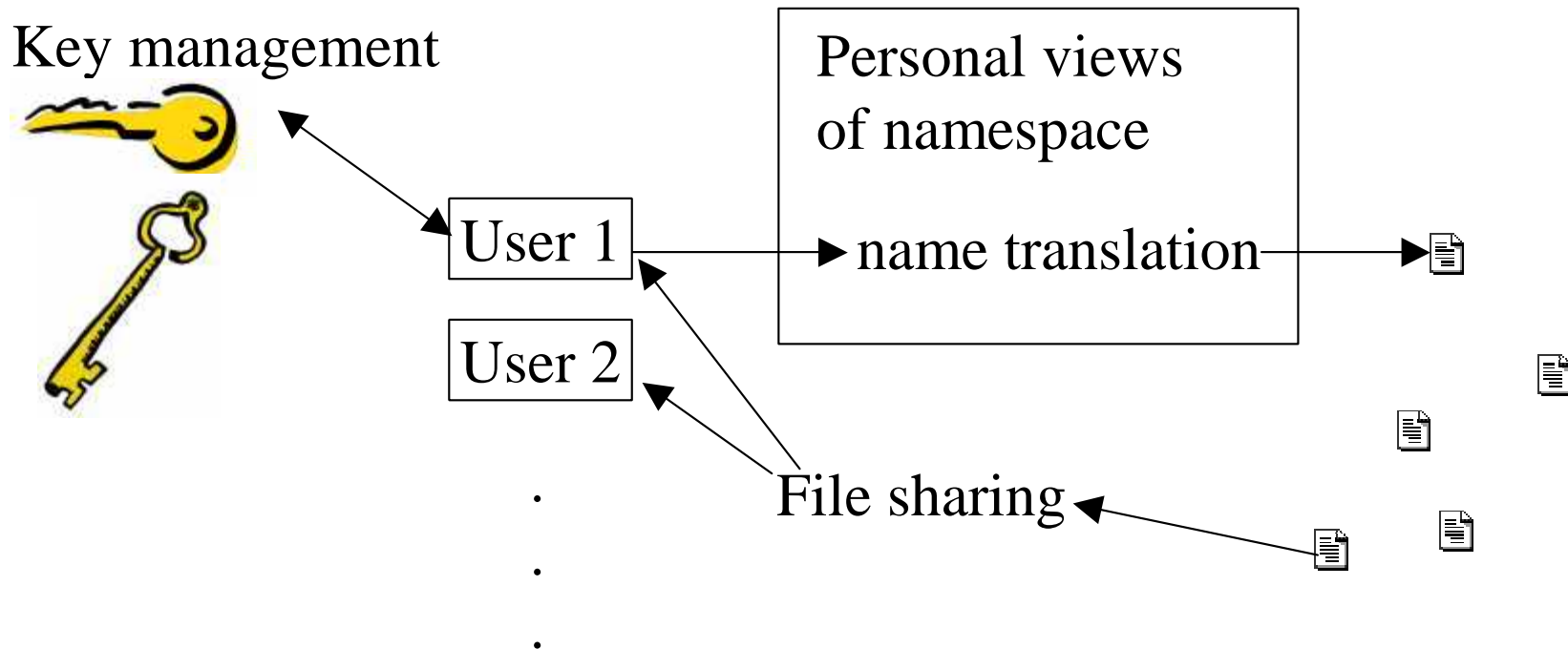
Use Certificates For Client Authentication



Encrypted File Support



Much More Further Work



More Users->More Testing



Kiwi vs. NFS

NFS

Kiwi

Security	Many known security problems	Built on top of SSL
Encryption	None	Transparent file encryption
Authentication	Based on trusting everyone	Certificates
Scalability	Low	Probably as well as web servers
Stability	High	Not quite there yet
Codebase	Large	Large (Apache, OpenSSL, etc)
Standards	Industry standard	Should be industry standard
Popularity	High	Isn't Kiwi a bird?
Features	Allow anyone access to machine	Allow access anywhere Can work behind firewall Doesn't end with FS



Acknowledgments

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