

MACWORLD SAN FRANCISCO 2006
M221

**THE XSERVE AS A
WEBSERVER:
A CASE STUDY**

OVERVIEW AND LESSONS LEARNED

F HARVELL
REED BRENNAN MEDIA ASSOCIATES
FHARVELL@SITESERVICES.NET

INTRODUCTION

CASE STUDY OVERVIEW

- ✻ RBMA Websites
- ✻ DailyINK Architecture
- ✻ Implementation Platform
- ✻ Mac OS X Server Support
- ✻ Server Performance
- ✻ Development Environment

RBMA WEBSITES

- ✻ RBMA (rbma.com)
- ✻ King Features Syndicate (kingfeatures.com)
- ✻ King-Online (king-online.com)
- ✻ DailyINK (dailyink.com)

DAILYINK
ARCHITECTURE

DAILYINK ARCHITECTURE

- ✿ DailyINK Server
 - ✿ Provides Feature Information
 - ✿ Maintains Access Controls
 - ✿ Maintains User Preferences
- ✿ King-Online Content Server
 - ✿ Provides the Live Content for the Pages

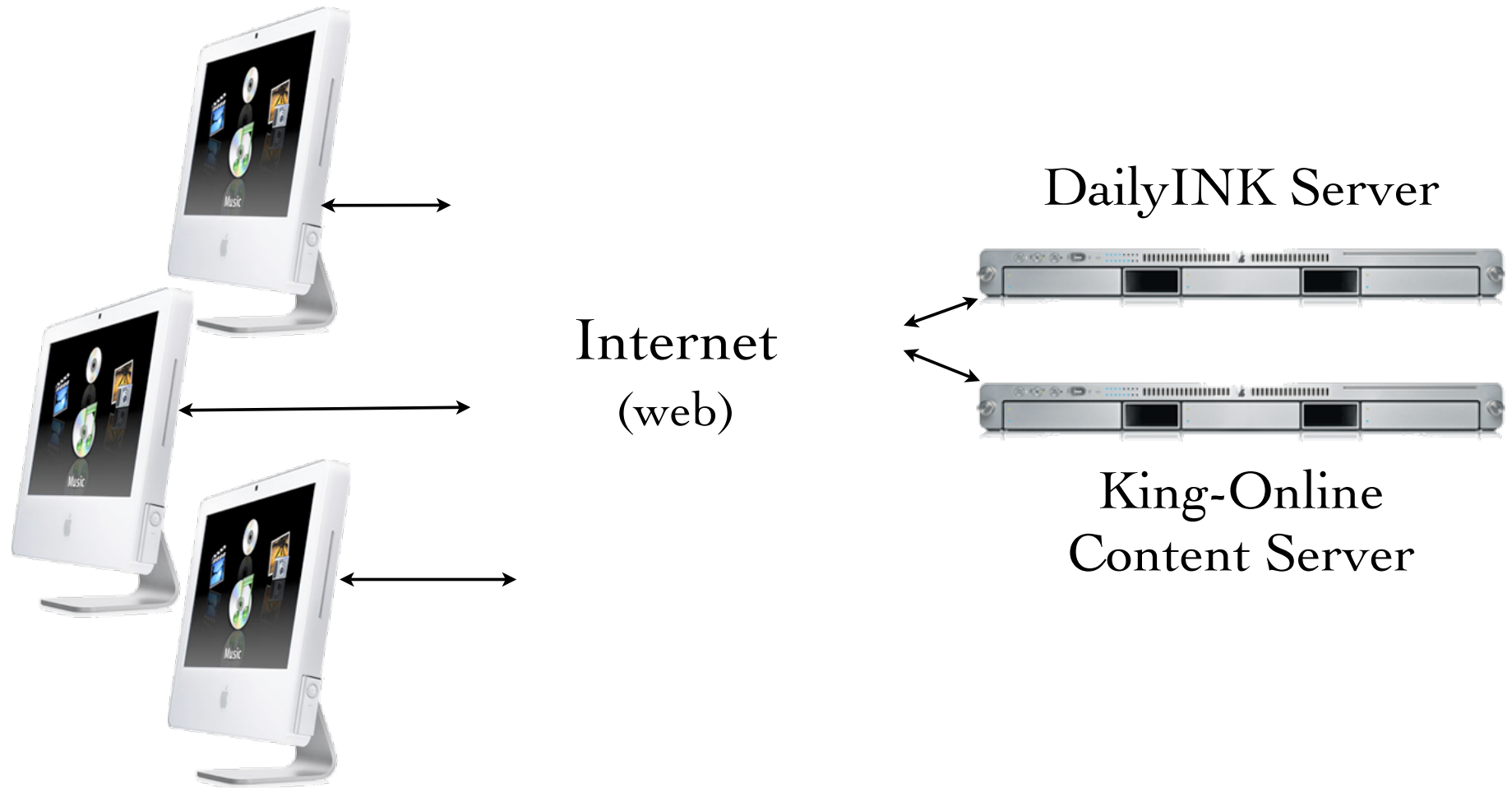
DAILY INK ARCHITECTURE

Main
Webpage
Provided by
the DailyINK
Website



Live Content
Provided by the
King-Online
Content Server

DAILYINK ARCHITECTURE



PRODUCTION PLATFORM

PRODUCTION PLATFORM

- ✻ Mac OS X Server 10.4
- ✻ Apache 1.4
- ✻ PHP 5.0
- ✻ PostgreSQL 8.1
- ✻ Zend Optimizer 2.5 / Accelerator 4.0
- ✻ Wusage 8
- ✻ Additional Services

MAC OS X SERVER

- ❁ Server Version of Mac OS X
- ❁ Web Enabled OS
- ❁ Unix Based
- ❁ Versions
 - ❁ Mac OS X 10.3 - Panther
 - ❁ Mac OS X 10.4 - Tiger



INSTALLATION



- ✻ Remote/Headless Installation
 - ✻ Server Assistant
 - ✻ Apple Remote Desktop
 - ✻ `sa_srchr`, `ssh`, `diskutil`, `installer`

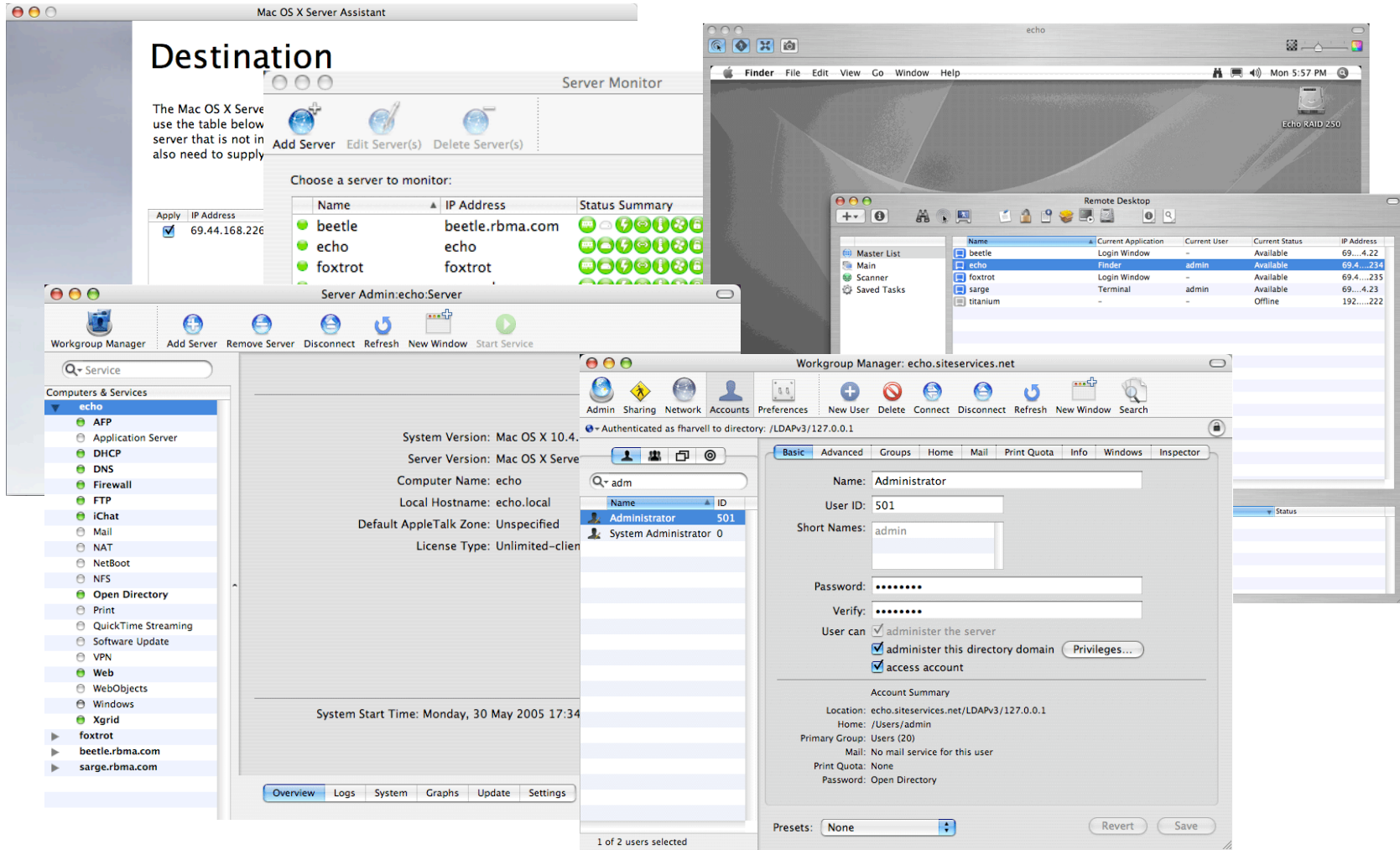
CONFIGURATION CHANGES

- ✱ `/etc/rc.common`
 - ✱ `ulimit -u 640`
 - ✱ `ulimit -n 2048`
- ✱ `/etc/sysctl.conf`
 - ✱ `kern.sysv.shmmax=1610612736`
 - ✱ `kern.sysv.shmmin=1`
 - ✱ `kern.sysv.shmni=128`
 - ✱ `kern.sysv.shmseg=32`
 - ✱ `kern.sysv.shmall=393216`

USER GROUP

- ✿ What Is a User Group
- ✿ Why Use Them
- ✿ System Preferences:
 - ✿ User Group Standard In System Preferences
- ✿ Workgroup Manager:
 - ✿ Create New User Group Before User
 - ✿ Assign New User Primary Group Before Saving

ADMIN TOOLS



APACHE 1.3

- ✻ Hyper Text Transfer Protocol (Webserver)
- ✻ Apache Server (1.3 and 2.0 provided)
- ✻ Server Admin Works with 1.3
- ✻ Supports Many Dynamic Content Modules
- ✻ Base Transport Application for PHP
(JBoss, WebDAV, WebObjects and More)

APACHE CONFIGURATION

- ✻ Using Server Admin:
 - ✻ OK for Basic Websites
- ✻ Direct Editing Files:
 - ✻ `/etc/httpd/httpd.conf`
 - ✻ `/etc/httpd/sites/*.conf`

PHP 5.0*

- ✻ PHP: Hypertext Processor
- ✻ Programming Language embedded in HTML
- ✻ Large Access to Dynamic Content Sources
(Apple Default: LDAP, Kerberos, cli, zlib,
trans-sid, XML, EXIF, FTP, mbstring,
mbregex, dbx, Sockets, IODBC, CURL,
MySQL)
- ✻ Extensive Documentation: www.php.net

*<http://www.php.net>

BUILDING PHP 5

- ✿ Necessary for PostgreSQL and Other Modules
- ✿ Download The Complete Source Package*
- ✿

```
./configure --prefix=/usr/local/php --with-apxs --with-openssl --with-zlib --with-curl --enable-dba --enable-dbase --enable-exif --enable-ftp --with-ldap --enable-mbstring --with-mysql --with-iodbc --with-pdo-pgsql --with-pgsql --enable-soap --enable-sockets --enable-shsvmsg --enable-sysvsem --enable-sysvshm --enable-wddx --enable-memory-limit
```
- ✿ `make, sudo make install`
- ✿ Copy `php.ini-recommended` to `/usr/local/php/lib/php.ini`

*<http://www.php.net>

PHP CONFIGURATION

/etc/php.ini

```
include_path "./opt/fts:/usr/local/lib/php"  
auto_prepend_file lib/prod/pre.php  
auto_append_file lib/prod/post.php  
magic_quotes_gpc Off  
magic_quotes_runtime Off  
magic_quotes_sybase Off  
register_globals Off  
session.use_trans_sid On
```

/etc/http/sites/*.conf

```
<IfModule mod_php5.c>  
  php_value include_path "./opt/fts:/usr/local/lib/php"  
  php_value auto_prepend_file lib/prod/pre.php  
  php_value auto_append_file lib/prod/post.php  
  php_flag magic_quotes_gpc Off  
  php_flag magic_quotes_runtime Off  
  php_flag magic_quotes_sybase Off  
  php_flag register_globals Off  
  php_flag session.use_trans_sid On  
</IfModule>
```

POSTGRESQL 8.1 *

- ✻ Powerful SQL Database
- ✻ Fully ACID Compliant
- ✻ Supports Referential Integrity and Subqueries
- ✻ No Data Loss in 8+ Years
- ✻ Open Source

*<http://www.postgresql.org/>

BUILDING POSTGRESQL 8.1

- ✻ Download the Complete Source Package*
- ✻ `configure, make, sudo make install`
- ✻ Install Startup Script in
`/Library/StartupItems/PostgreSQL`
- ✻ Initialize database using `initdb`
- ✻ Configure New Database

*<http://www.postgresql.org>

POSTGRESQL CONFIGURATION

```
/usr/local/pgsql/data/postgresql.conf
```

```
max_connections = 512

shared_buffers = 65536      # min 16, max_connections*2, 8KB each
temp_buffers = 8192        # min 100, 8KB each
max_prepared_transactions = 128 # can be 0 or more
work_mem = 65536           # min 64, size in KB
maintenance_work_mem = 65536 # min 1024, size in KB
max_stack_depth = 8192     # min 100, size in KB

max_fsm_pages = 200000     # min max_fsm_relations*16, 6B each
max_fsm_relations = 10000 # min 100, ~50 bytes each
wal_buffers = 32          # min 4, 8KB each
checkpoint_segments = 10  # logfile segments, min 1, 16MB each

stats_start_collector = on
stats_block_level = on
stats_row_level = on
autovacuum = on           # enable autovacuum subprocess
```

Note: Other Lines May Retain Defaults.

POSTGRESQL CONFIGURATION

```
/usr/local/pgsql/data/pg_hba.conf
```

```
local    all             all             password  
host     all             all             127.0.0.1/32  password
```

Note: Be sure that all other lines are commented out.

ZEND* ENHANCEMENTS

- ☼ Zend Optimizer - Free tool that optimizes the execution of PHP applications.
- ☼ Zend Platform - Product that provides a code accelerator, database cache, and more.
- ☼ Zend Studio - Product that provide a robust IDE and debug tools and has been integrated with the Zend Platform.

*<http://www.zend.com>

WUSAGE* LOG ANALYSIS

- ☼ Wusage
- ☼ Robust Reports
- ☼ Online Mode
- ☼ Command Line
- ☼ Log Rotation
- ☼ Usertrack Module

Month of 2005-5-1 to 2005-5-31

http://www.kingfeatures.com/stats/wusage/monthly/2005/05/01

Address Book News (1185) Apple IT Pro .Mac Mac Rumors MacNN CNET XOXO Apple (88)

Month of 2005-5-1 to 2005-5-31

Important Totals

Item	Accesses	Bytes	Visits	Charts
All Files Served	14,185,473	26,754,453,877	295,880	View Chart
Page Views	5,110,666	15,938,772,202	295,299	View Chart
Unique Visitors (Best Method)	97,690			View Chart
Home Page Views	24,450	443,400,072	9,967	View Chart

Executive Summary

97,690 unique visitors came to the site, as determined by typical behavior of browsers with a non-rotating IP address and including a projection of the true number of visitors with rotating IP addresses.

The web site received 295,880 visits. A typical visitor examined 34.59 distinct files before leaving the site. A typical visit lasted for 5.32 minutes. The longest visit lasted for 1,192 minutes.

The web server was visited by 328 distinct users accepting cookies, as determined by individual user-identifying "cookies" received at least twice.

Visitors came from 107,812 distinct Internet addresses.

The web server delivered 10,100 unique documents one or more times each.

77 distinct types of documents were delivered.

Calendar of Reports

Individual Reports

- [Executive Summary and Totals](#)
- [Accesses by Hour](#)
- [Accesses by Day](#)
- [Top Documents](#)
- [Top Entry Pages](#)
Visits typically began at these pages.
- [Top Exit Pages](#)
Visits typically ended at these pages.
- [Documents by Directory](#)
- [File Types \(Extensions\)](#)
- [Authorized Users](#)
- [Top Visitor Sites](#)
- [Top Visitor Domains](#)
- [Top Users](#)
as Determined by Cookies
- [Top Proxy Sites](#)
- [Top Proxy Domains](#)
- [Top Web Browsers](#)
Also known as "user agents"
- [Top Operating Systems](#)
Operating systems used by visitors
- [Screen Resolution and Depth \(Colors\)](#)
Screen size and simultaneous colors available on visiting computers
- [Top Referring URLs](#)

*<http://www.boutell.com/wusage/>

APACHE USER TRACKING

- ✻ Provides an Ability to Track Number of Unique Users
- ✻ Provides an Ability to Track Website Navigation Paths

- ✻ Apache usertrack_module

```
LoadModule usertrack_module  
    libexec/httpd/mod_usertrack.so
```

```
AddModule mod_usertrack.c
```

```
CookieTracking on
```

```
CustomLog '|/usr/sbin/rotatelogs
```

```
    "/var/log/httpd/access_log" 604800' "%h %l
```

```
    %u %t \"%r\" %>s %b %v \"%{Referer}i\"
```

```
    \"%{User-Agent}i\" \"%{Cookie}n\""
```



Note: Can Be Done
In Server Admin

PERL 5.8

- ✻ Useful for Non-Web Applications
- ✻ Interfaces with Database
- ✻ Supports 8000+ Modules
- ✻ Used to Send Daily Email Messages
- ✻ Used for Daily Maintenance Operations
- ✻ Included in Mac OS X 10.4

POSTFIX

- ✻ High Performance Mail Transport Agent
- ✻ Integrated with SpamAssassin and ClamAV
- ✻ Integrated into Apple Administration Tools
- ✻ Client Access Through Cyrus IMAP
- ✻ DNS: MX Records, Reverse DNS
- ✻ Included in Mac OS X 10.4

FTP

- ✻ File Transfer Protocol
- ✻ Provided in Mac OS X 10.4
- ✻ Administered by Server Admin

FIREWALL

- ✻ Administered via Server Admin
- ✻ Effective
- ✻ Should be Enabled on *Any* Internet Server
- ✻ Limited Ability to Control In/Out Traffic

FIREWALL CONFIGURATION

- ☼ Apache Standard Ports:

- ☼ TCP Port 80 - http://

- ☼ TCP Port 443 - https://

- ☼ Apache Apple Ports:

- ☼ TCP Port 16080 - Performance Cache

FIREWALL CONFIGURATION

☼ Active FTP TCP Ports

- ☼ FTP server's port 21 from any (Client initiates connection)
- ☼ FTP server's port 21 to ports > 1024 (Server responds to client's control port)
- ☼ FTP server's port 20 to ports > 1024 (Server initiates connection to client's port)
- ☼ FTP server's port 20 from ports > 1024 (Client sends ACKs to server's port)

☼ Passive FTP TCP Ports

- ☼ FTP server's port 21 from any (Client initiates connection)
- ☼ FTP server's port 21 to ports > 1024 (Server responds to client's control port)
- ☼ FTP server's ports > 1024 from any (Client connection to port specified by server)
- ☼ FTP server's ports > 1024 to ports > 1024 (Server ACKs and data to client)

☼ SFTP TCP Port

- ☼ SFTP server's port 22 from anywhere

SERVER PERFORMANCE

WEBSITE TRAFFIC

- ❁ Single Server Architecture Served Over:
 - ❁ 10,000,000 HTTP Requests/Month
 - ❁ 50,000 Unique Visitors/Month
 - ❁ 25,000 FTP Transfers/Month
 - ❁ 80 Websites

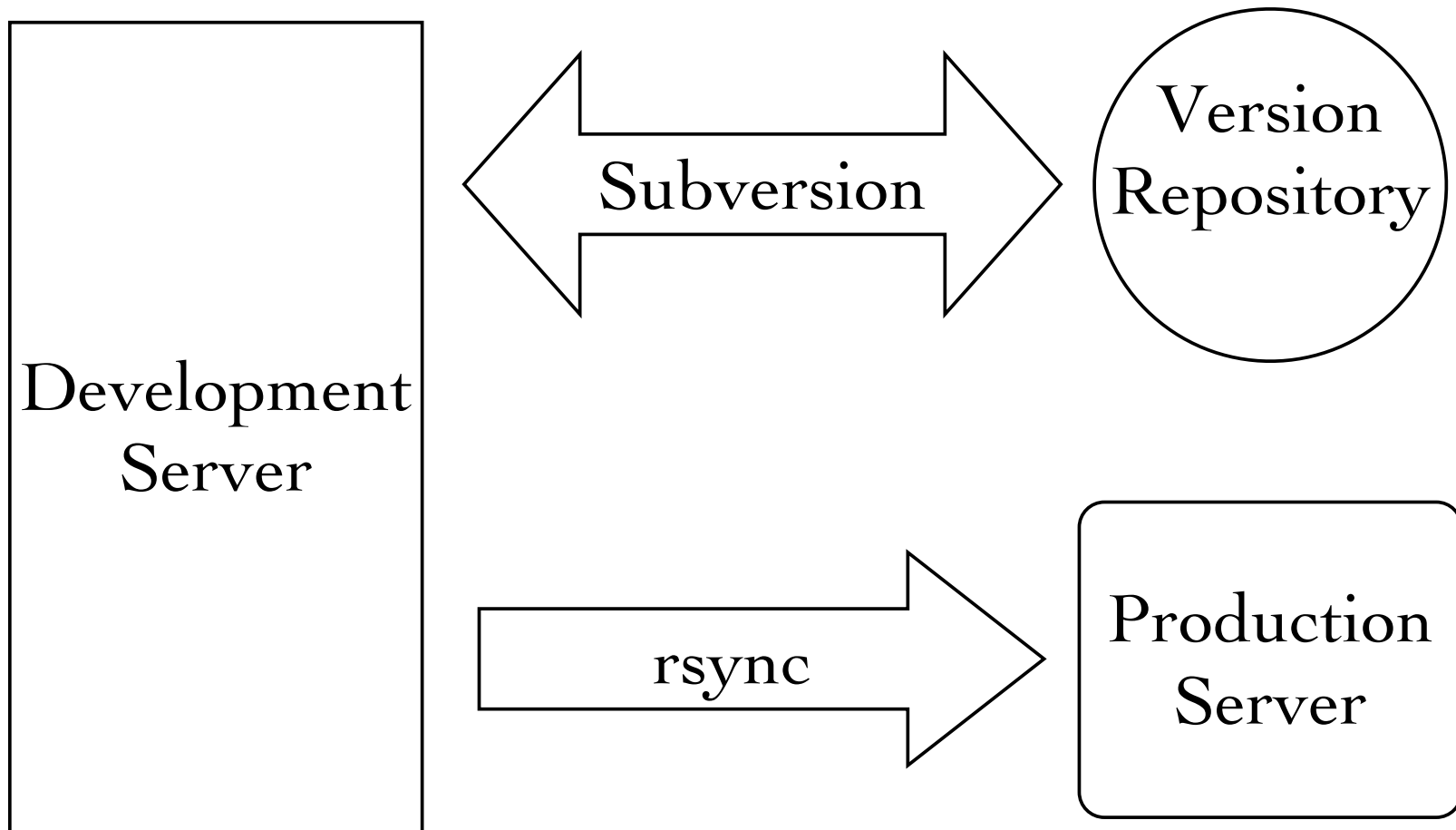
PERFORMANCE ISSUES

- ✻ Low Requests Per Second Handling
- ✻ Chokes At About 500 httpd Processes
- ✻ Performance/Context Switching Death Spiral
 - ✻ Anandtech Reports*
- ✻ Memory Leak (Virtual Memory)

*<http://www.anandtech.com/mac/>

**DEVELOPMENT
ENVIRONMENT**

SANDBOX DEVELOPMENT



DEVELOPMENT SERVER

- ✻ Xserve Running Mac OS X 10.4
- ✻ Duplicate of the Production Platform
- ✻ Multiple Sandboxes (One Per User)
- ✻ Direct (URL) Access to Each Sandbox

SUBVERSION*

- ✻ Version Control System
- ✻ Supports Development Sandboxes
- ✻ Not Included in Mac OS X 10.4
 - ✻ (Replaces CVS Which Is Included)
 - ✻ Not Managed by Server Admin
- ✻ Download Mac OS X Package and Install*

*<http://subversion.tigris.org/>

SUBVERSION REPOSITORY

- ✻ Use Workgroup Manager:
 - ✻ Add svn Group
 - ✻ Add svn User (Using svn Group)
 - ✻ Add Subversion Admin Users to svn Group
- ✻ Log On as svn (Creating Home Directory)
- ✻ In Terminal:
 - ✻ `umask 002`
 - ✻ `export PATH="/usr/local/bin:$PATH"`
 - ✻ `svnadmin create Repository`

SVNSERVER CONFIGURATION

Repository/conf/svnserve.conf

```
[general]
anon-access = none
auth-access = write
password-db = passwd
realm = siteservices.net, Inc.
```

Repository/conf/passwd

```
[users]
fharvell = a_good_pwd
thunt = a_better_pwd
```

ENABLING SVN SERVER

/LIBRARY/LAUNCHDAEMONS/ORG.TIGRIS.SUBVERSION.PLIST

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE plist PUBLIC "-//Apple Computer//DTD PLIST
1.0//EN" "http://www.apple.com/DTDs/PropertyList-1.0.dtd">
<plist version="1.0">
<dict>
  <key>Label</key>
  <string>org.tigris.subversion</string>
  <key>Program</key>
  <string>/usr/local/bin/svnserve</string>
  <key>ProgramArguments</key>
  <array>
    <string>svnserve</string>
    <string>-i </string>
    <string>-r</string>
    <string>/Users/svn/Repository</string>
  </array>
  <key>Sockets</key>
  <dict>
    <key>Listeners</key>
    <dict>
      <key>SockPassive</key>
      <true/>
      <key>SockServiceName</key>
      <string>svn</string>
      <key>SockType</key>
      <string>SOCK_STREAM</string>
    </dict>
  </dict>
</dict>
```

```
<key>inetdCompatibility</key>
<dict>
  <key>Wait</key>
  <false/>
</dict>
<key>UserName</key>
<string>svn</string>
<key>GroupName</key>
<string>svn</string>
</dict>
</plist>
```

Mac OS X 10.3 /etc/xinetd.d/svn

```
service svn
{
  socket_type = stream
  protocol   = tcp
  wait       = no
  user       = svn
  server     = /usr/local/bin/svnserve
  server_args = -i -r /Users/svn/Repository
}
```

RSYNC

- ✱ Remote Sync
- ✱ Fast Updates (Only Changed Files)
- ✱ Can Synchronize Directory Trees
- ✱ Requires Full Tree on Source and Target Systems
- ✱ Included in Mac OS X 10.4
 - ✱ Not Managed by Server Admin

RSYNCD CONFIGURATION

`/etc/rsyncd.conf`

```
secrets file = /etc/rsyncd.secrets

[king2]
    path = /Volumes/Users/king2
    auth users = king2
    uid = king2
    gid = king2
    read only = no
    list = no
```

`/etc/rsyncd.secrets`

```
king2:kingxfer
dink:dinkxfer
rbma2:testxfer
```

ENABLING RSYNC DAEMON

/LIBRARY/LAUNCHDAEMONS/ORG.SAMBA.RSYNC.PLIST

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE plist PUBLIC "-//Apple Computer//DTD PLIST
1.0//EN" "http://www.apple.com/DTDs/PropertyList-1.0.dtd">
<plist version="1.0">
<dict>
  <key>Label</key>
  <string>org.samba.rsync</string>
  <key>Program</key>
  <string>/usr/bin/rsync</string>
  <key>ProgramArguments</key>
  <array>
    <string>rsync</string>
    <string>--daemon</string>
  </array>
  <key>Sockets</key>
  <dict>
    <key>Listeners</key>
    <dict>
      <key>SockPassive</key>
      <true/>
      <key>SockServiceName</key>
      <string>rsync</string>
      <key>SockType</key>
      <string>SOCK_STREAM</string>
    </dict>
  </dict>
  <key>inetdCompatibility</key>
  <dict>
    <key>Wait</key>
    <false/>
  </dict>
</dict>
</plist>
```

Mac OS X 10.3 /etc/xinetd.d/rsync

```
service rsync
{
    disable = no
    instances = 50
    socket_type = stream
    wait = no
    user = root
    server = /usr/bin/rsync
    server_args = --daemon
    log_on_failure += USERID
}
```

FTSUTIL LIBRARY*

- ✻ PHP Library
- ✻ Facilitates the Development of Scalable, Robust Website Applications
- ✻ Provides “Automagic” Database Forms
- ✻ Provides Multiple Content Modules
- ✻ Provides Embedded Debugging and Production Error Identification Support

*<http://www.firsttimesoftware.com/ftsutil/>

ADDITIONAL FIREWALL CONFIGURATION

- ✻ Subversion:

- ✻ TCP Port 3690 (or 22 if via ssh)

- ✻ rsync:

- ✻ TCP Port 873

DEVELOPMENT DEMO

CONCLUSION

- ✻ Mac OS X Server Provides a Robust Web Services Platform
- ✻ Unix Base Supports Large Infrastructure
- ✻ Admin Tools are Incomplete/Inflexible
- ✻ Performance Challenges*
- ✻ Virtual Memory Leak

*<http://www.anandtech.com/mac/>

THANK YOU

Q & A



F Harvell

I have over 20 years experience with Unix and Unix like systems and have been working with the Internet since 1988. I have worked as a programmer, systems administrator, systems analyst, web developer, development manager and consultant on many projects with widely varying needs.



For more than 10 years, RBMA has earned the trust and confidence of more than 300 newspapers, including more than half of North America's 100 largest daily newspapers. Each week, RBMA delivers more than 3,500 custom-paginated pages, and edits and distributes more than 200 features for King Features Syndicate. RBMA also maintains several KFS websites including DailyINK.com.

[HTTP://WWW.SITESERVICES.NET/MW/](http://www.siteservices.net/mw/)