

# Wesley Whetstone

Wesley is a Mac Operations Engineer at Square managing any and all things Mac. Before Square he was on the Client Platform Engineering team at Facebook.

If you can't find Wes behind a computer he's probably making tea or planning his next adventure.



# Caching servers, DNS Tricks, and More

# What is a Caching service?

- Speeds up the apparent download of content distributed by Apple through the internet by caching content locally on a server.
- Latest Server App v4.0.3 supports client devices with at least OS X v10.8.2, iOS 7, iTunes 11.0.2 (both Mac and Windows)
- Caches software updates for Apple TV, iOS and OS X, App Store purchases, iBook downloads, iTunes U apps and books, and Internet Recovery software (but not Airport Extreme)

# What is a Caching service?

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- Caches software updates for Apple TV, iOS and OS X.. App Store purchases, iBook downloads, iTunes U apps and books, and Internet Recovery software (but not Airport Extreme)

# What is a Caching service?

	OS X $\geq$ 10.8.2	iOS $\geq$ 7	Apple TV
Software Updates			
App Store			NA
iBooks			NA
Internet Recovery		NA	
iTunes Media			NA

Why do I need a caching server?

I'm glad you asked ;)





1.6 GB





# Easy Setup

The screenshot shows the 'Caching' settings in macOS System Preferences. The left sidebar lists various system services, with 'Caching' selected under the 'Services' section. The main pane displays the 'Caching' status as 'ON' with a green toggle. Below this, the 'Access' section shows the status as 'Available' and permissions set to 'All Networks'. The 'Settings' section shows the volume set to 'Data' and the cache size set to 420 GB, with a slider ranging from 25 GB to Unlimited. The 'Usage' section shows that 419.68 GB of the 420 GB cache is used, with a bar chart indicating the usage is primarily composed of Mac Software (blue), iOS Software (purple), and a small amount of Other (yellow). Buttons for 'Edit...', 'Reset...', and 'Learn about configuring this service' are visible.

**Server**

- raccoon
- Alerts
- Certificates
- Logs
- Stats

**Accounts**

- Users
- Groups

**Services**

- Caching**
- Calendar
- Contacts
- File Sharing
- Mail
- Messages
- Profile Manager
- Time Machine
- VPN
- Websites
- Wiki
- Xcode

**Advanced**

- DHCP
- DNS
- FTP
- NetInstall
- Open Directory
- Software Update
- Xsan

## Caching

**Access**

Status: ● Available - Devices on your local network will automatically use this service  
[Learn about configuring this service](#)

Permissions: All Networks [Edit...](#)

### Settings

Volume: Data [Edit...](#)

Cache Size: 420 GB

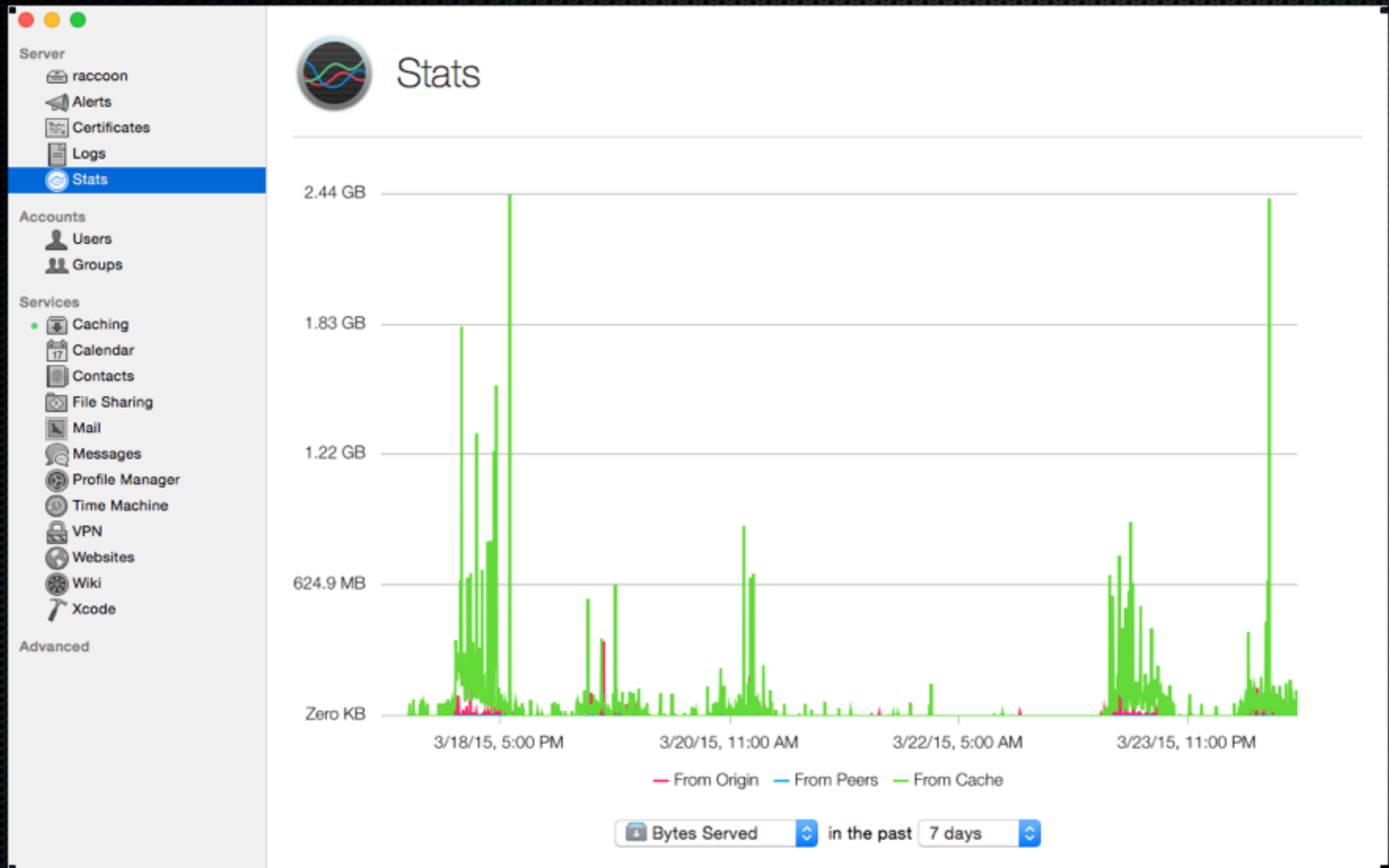
25 GB 150 GB 250 GB 400 GB Unlimited

### Usage

Cache Used: 419.68 GB used of 420 GB [Reset...](#)

Mac Software iOS Software Other

# Easy Setup





#BETAwards  
**BET**★

MIDDLECHILDSWAG

# How the caching server works...

- The 1st download is always from Apple and is cached to the server
- Later downloads *may* come from the server
- The server *may* have peers
- Clients *always* fallback to download directly from Apple when the client can't get to the server or any peers
- Clients tend to stick with the 1st good download source

# How the caching server works...



local address: 192.168.2.78  
public IP: 24.172.20.238

GUID:2BC5071E-7007-476F-A18D-78EA55C84991



# How the caching server works...



local address: 192.168.2.78  
public IP: 24.172.20.238



Request for package

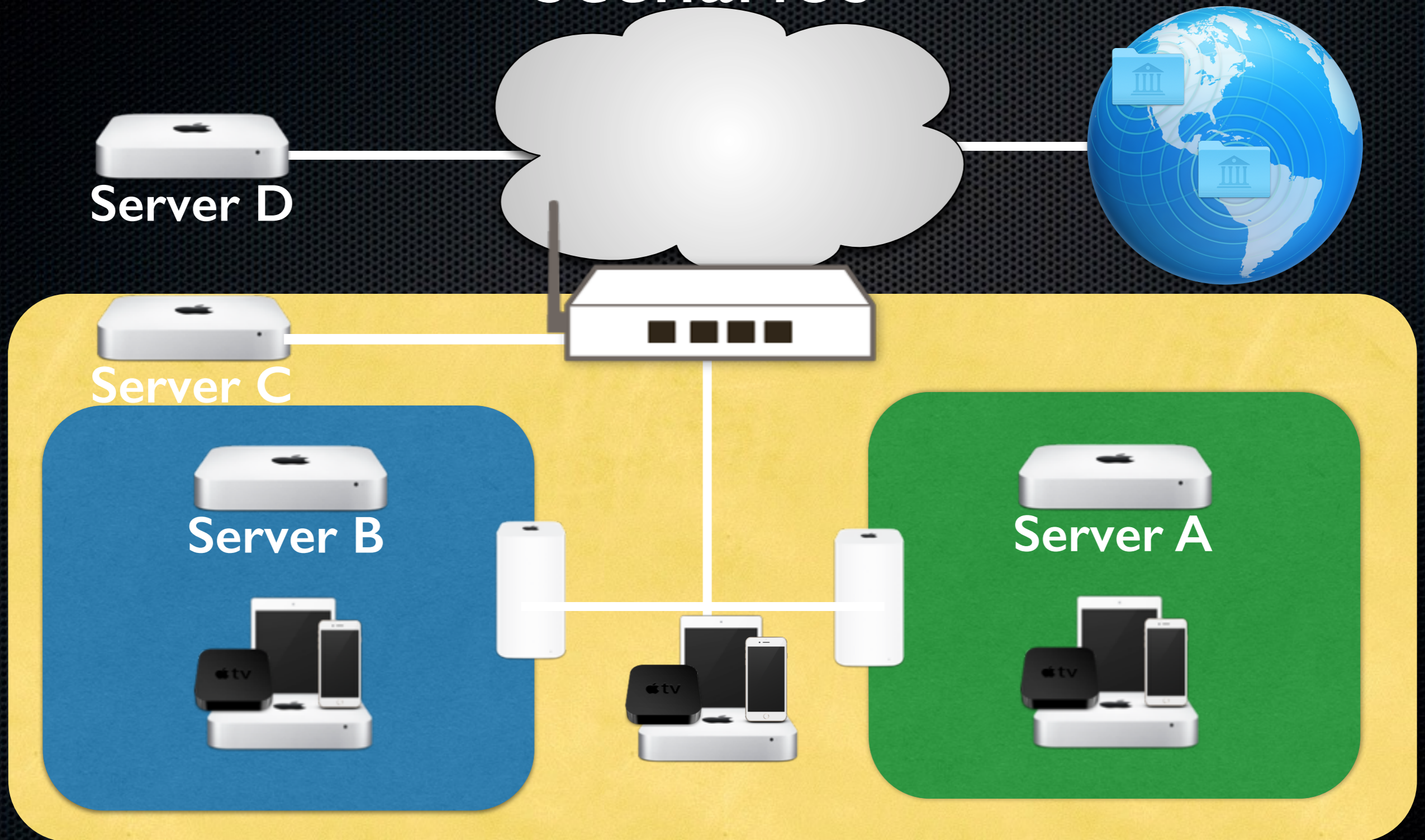


local address: 192.168.2.33  
public IP: 24.172.20.238

# How the caching server works...

- The Good 😊:
  - No Client Device Configuration
  - Little Server Configuration Needed
  - Servers *may* work together as automatic peers
  - New feature allows for servers outside of NAT
- The Bad 😡:
  - Relies upon IP addressing not DNS (no tricks, well maybe)
  - Challenging to work with IP load balancing
  - No built in “pre-downloading”
- The Ugly 😈:
  - Some manual editing of DNS-SD TXT records

# Scenarios



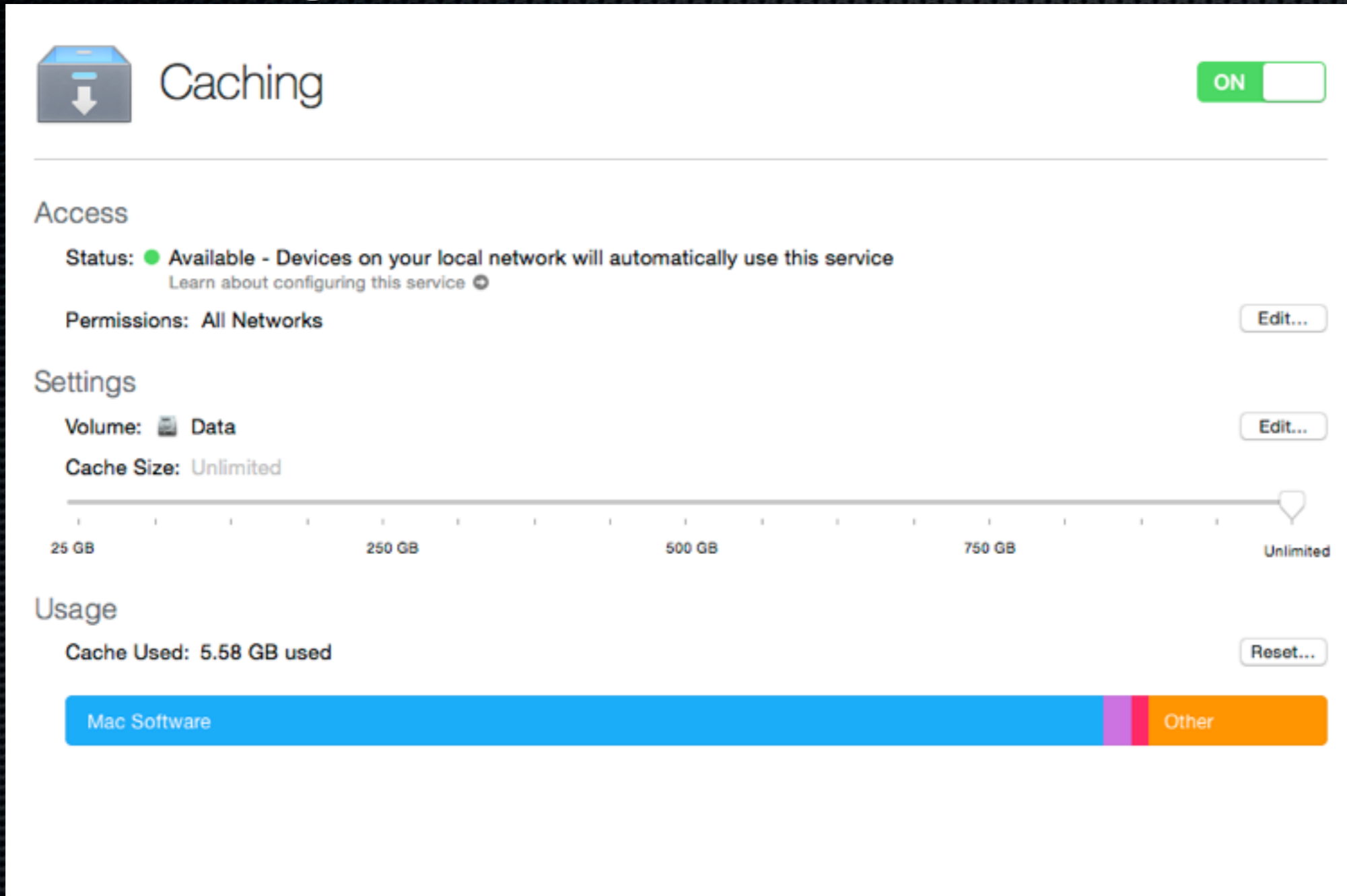
# New in Yosemite...

- New in Yosemite is the ability to have caching servers outside of your private network
- Or as Apple says, “caching content in non-NAT networks”
- Requires a Public IP address for the server
- Requires a manual edit of DNS records to add a DNS-SD TXT record
- New flat graphic finish. Because well.. Yosemite. (Thanks Phil)

# Caching in non-NAT networks

- Configure server to use public IP address
- Configure caching service with public range of IP
- Copy TXT record from Server app
- Add TXT record to db zone file per...
  - caching.apple.com zone (Server Essentials)
    - create a www host A record
    - \_aaplcache.\_tcp.caching.apple.com TXT entry
  - your own domain zone (Advanced Server Help)
    - \_aaplcache.\_tcp.<domain name> TXT entry
  - “prs=<start IP>-<end IP>”

# Caching in non-NAT networks



The screenshot displays the 'Caching' configuration page. At the top, there is a 'Caching' header with a download icon and a green 'ON' toggle switch. Below this, the 'Access' section shows the status as 'Available' with a green dot and a link to learn more. The permissions are set to 'All Networks' with an 'Edit...' button. The 'Settings' section shows the volume as 'Data' and the cache size as 'Unlimited', with an 'Edit...' button. A slider for cache size ranges from 25 GB to Unlimited. The 'Usage' section shows 'Cache Used: 5.58 GB used' and a 'Reset...' button. A horizontal bar chart shows the usage breakdown: 'Mac Software' (blue, approximately 5.58 GB) and 'Other' (orange, approximately 0.42 GB).

**Caching** ON

---

**Access**

Status: ● Available - Devices on your local network will automatically use this service  
[Learn about configuring this service](#)

Permissions: All Networks Edit...

**Settings**

Volume: Data Edit...

Cache Size: Unlimited

25 GB 250 GB 500 GB 750 GB Unlimited

**Usage**

Cache Used: 5.58 GB used Reset...

Mac Software Other

# Caching in non-NAT networks

The screenshot shows a 'Caching' configuration window with the following elements:

- Cache content for clients connecting from:** A dropdown menu set to 'all networks'.
- Serve clients with public addresses:** A dropdown menu with 'matching this server's network' selected (indicated by a checkmark) and 'on other networks' as an option.
- Network List:** A table with a header 'Click (+) to add networks' and a single row containing a '+ -' button and a 'Create a new network' button.
- Buttons:** 'Client Configuration...', 'Cancel', and 'OK'.
- Footer:** A note stating 'public IP address will use this cache.'

The background interface includes a sidebar with 'Caching' selected, a main area with a toggle switch set to 'ON', and a 'Usage' section showing 'Cache Used: 5.58 GB used' and a bar chart with 'Mac Software' and 'Other' categories.

# Caching in non-NAT networks

The screenshot displays a network configuration interface with a modal dialog box open. The dialog box contains the following text:

Copy the TXT record below and enter it into your network DNS configuration.

`_aaplcache._tcp 259200 IN TXT "prs=10.0.0.1-10.0.0.254"`

Buttons: Done

Below the dialog box, there is a section for "Client Configuration..." with a "Cancel" button and an "OK" button. The background interface shows a sidebar with "Acce", "Sta", "Per", "Settin", "Vol", "Cac", and "Usage". The main area has a toggle switch labeled "ON", an "Edit..." button, a "Client Configuration..." button, a "Reset..." button, and a usage bar showing "Mac Software" and "Other".

# Caching in non-NAT networks

- Copy the generated TXT record from the Client Configuration sheet.
- Open the zone file. For example, /Library/Server/named/db.example.com with your favorite editor. (vim of course)
- Past the TXT record at the end of the configuration file. Save.

# Advanced Options

- `serveradmin`man serveradmin``
  - settings caching (some items are unchangeable)
  - fullstatus caching (more information than usual)
  - ``sudo serveradmin settings caching``
- `edit /Library/Server/Caching/Config/Config.plist`
  - better for setting range values
  - ``sudo serveradmin settings caching:Interface = enl``
  - `chown _assetcache:_assetcache`

# Advanced Options

- Exposed in the GUI (easier to manage in Server app)
  - CacheLimit
  - DataPath
  - PublicRanges
  - ListenRanges
  - ListenRangesOnly
  - LocalSubnetsOnly

# Advanced Options

- Not available in the GUI
  - Interface
  - LogClientIdentity
  - LogLevel
  - MaxConcurrentClients
  - MaxPeersToQuery
  - OriginDownloadTimeout
  - PeerDownloadTimeout
  - PeerFilterRanges
  - PeerNotifyTimeout
  - PeerQueryTimeout
  - PeerRetryInterval
  - Port
  - ReservedVolumeSpace

# Advanced Options

- Interface - The BSD name of a network interface to be used by Caching service. Default listen on all.
- Port - The TCP port number on which Caching service accepts requests for downloads. Default is random port.
- LogClientIdentity - Determines whether or not the server should log the IP address and port number of the client requesting each asset. Default false.
- LogLevel - default, off, error, warn, info, verbose. Additional logging is saved to `/Library/Server/Caching/Logs/Debug.log`

# Quick examples

```
serveradmin settings caching:LogLevel = verbose
```

```
tail -f /Library/Server/Caching/Logs/Debug.log
```

```
tail -f /var/log/commerce.log
```

```
serveradmin fullstatus caching
```

```
serveradmin fullstatus caching | grep -A 1 "BytesUsed"\  
| cut -d "=" -f 2
```

```
grep "Request by" /Library/Server/Caching/Logs/*.log\  
| cut -d "'" -f 2 | sort | uniq
```

# Multiple Public IP Address Trick

```
security {
  nat {
    source {
      pool APPLE-NAT {
        address {
          your_public_ip_address/32;
        }
      }
    }
    rule-set TRUST-to-public {
      from zone TRUST;
      to zone PUBLIC;
      rule PUBLIC-APPLE-NAT {
        match {
          source-address 0.0.0.0/0;
          destination-address 17.0.0.0/8;
        }
        then {
          source-nat {
            pool {
              APPLE-NAT;
            }
          }
        }
      }
    }
  }
}
```

# Configuring Global Caching Servers.

- Set the server with an Apple ID from that region.

# Enhance Server Performance

- Link Aggregate interface for x2 (or more) bandwidth
  - Thunderbolt Ethernet Adapter
  - Create new Virtual Interface
- For caching, may configure one client for automatic downloads of content (pre-downloading)
- Apple's content servers apparently are in the range: 17.173.66.1-17.173.66.254 so prioritize traffic.

# More Resources

- Built in Server app help (links in every service)
- <http://help.apple.com/advancedserveradmin/mac/4.0>
- Support Articles: HT200231, HT202657, PH15567
- <https://www.yesdevnull.net/tag/caching/> (Dan Barrett)
- <http://blog.fraserhess.com/2014/10/caching-server-enterprise-edition.html>

# Products

- CacheWarmer (\$4.99) by Glencode LLC - <http://blog.fraserhess.com/2014/12/introducing-cachewarmer.html>
- Learning Apple OS X Mavericks Server Training Video (\$99.95 or subscribe) by Chris Tarnowiecky (New Yosemite version available from InfiniteSkills/O'Reilly Media shortly)
- OS X Server Essentials 10.10 (\$69.99 or subscribe) By Arek Dreyer, Ben Greisler from Pearson

# Questions?



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