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Chris sometimes goes by the nickname “Tarny” depending upon how many other Chris’ are around and if the spirit of his Aunt “The Original Tarny” will complain. He has 2 adult children in college, a wife and 2 cats.



Caching servers, DNS Tricks, and More












What is Caching service?

- Speeds up the apparent download of content distributed by Apple through the internet by caching content locally on a server.
- 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 AE base station updates)

What is Caching service?

| | OS X $\geq 10.8.2$ | iOS ≥ 7 | Apple TV |
|-------------------|---|---|---|
| software updates |  |  |  |
| App Store |  |  | NA |
| iBooks |  |  | NA |
| internet recovery |  | NA |  |
| iTunes media |  |  | NA |

What is Caching service?

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|-------------------|---|---|---|
| software updates |  |  |  |
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| iBooks |  |  | NA |
| internet recovery |  | NA |  |
| iTunes media |  |  | NA |

Easy Setup



Caching

ON

Access

Status: ● Available - Devices on your local network will automatically use this service

[Learn about configuring this service](#)

Permissions: All Networks

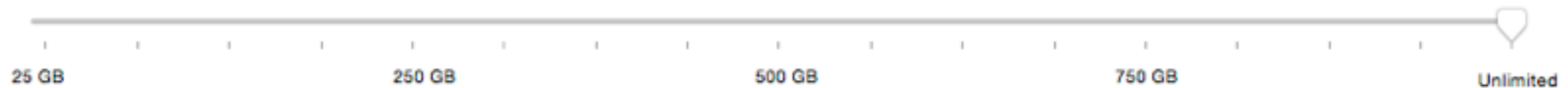
Edit...

Settings

Volume: Data

Edit...

Cache Size: Unlimited



Usage

Cache Used: 5.58 GB used

Reset...

Mac Software

Other

How 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 caching server works...



local address: 192.168.2.78
public IP: 24.172.20.238

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



How caching server works...



local address: 192.168.2.78
public IP: 24.172.20.238



Request for package

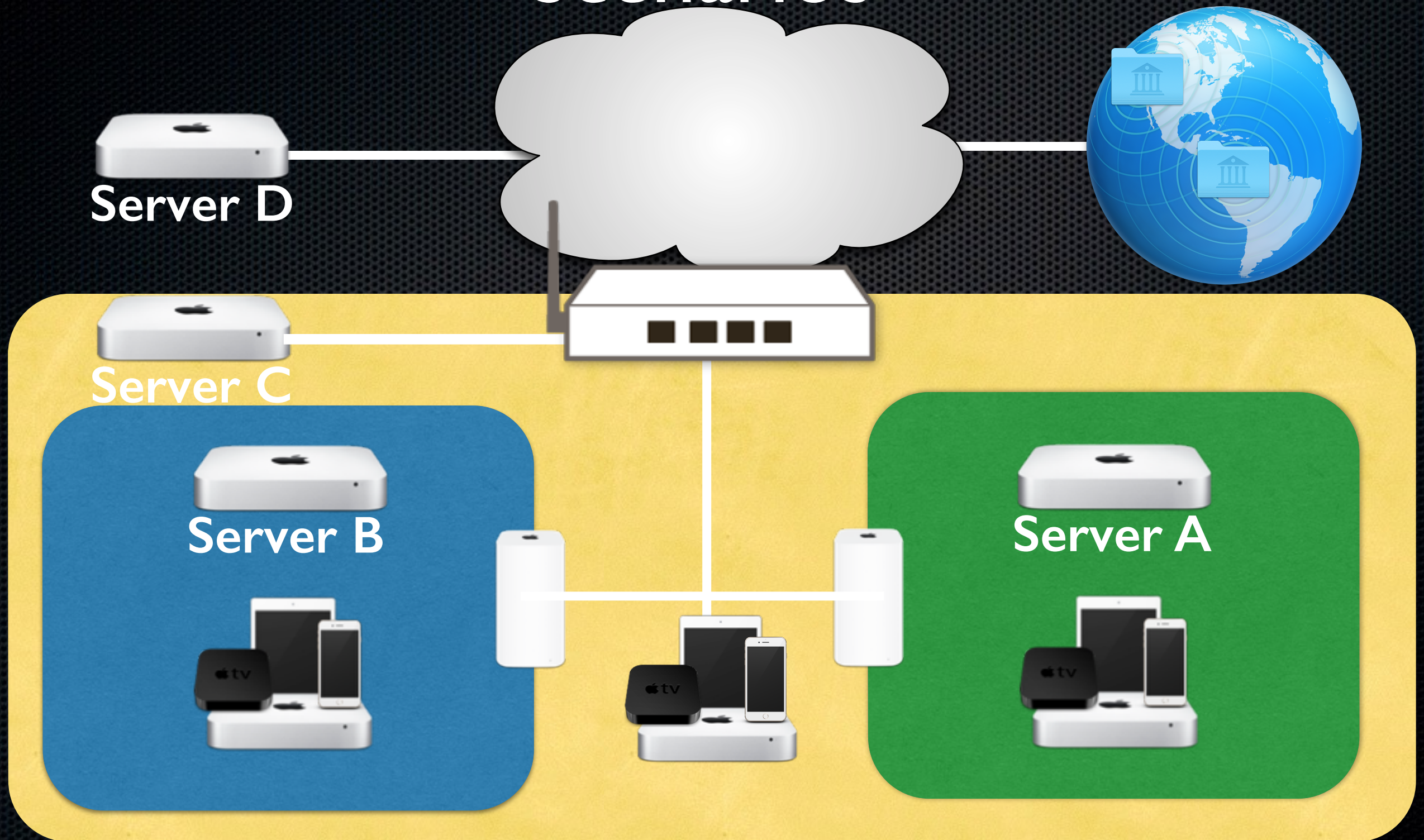


local address: 192.168.2.33
public IP: 24.172.20.238

How 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)
 - Challenging to work with IP load balancing
 - No built in “pre-downloading”
- The Ugly 😈:
 - Some manual editing of DNS-SD TXT records
(wait you just said not DNS??? I’ll get there.)

Scenarios



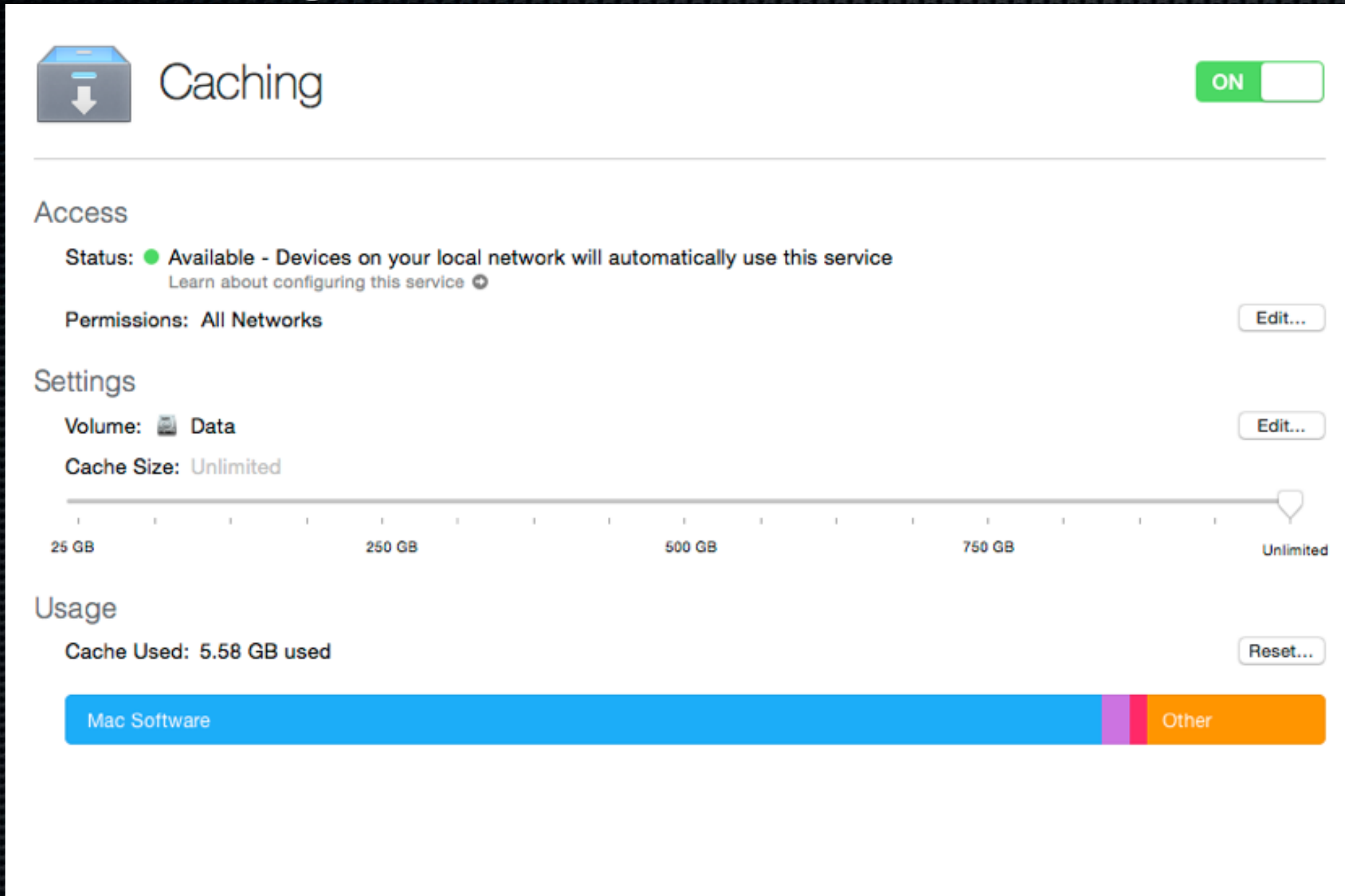
New in Yosemite...

- 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

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' with a 'Reset...' button. A horizontal bar chart shows the usage breakdown: 'Mac Software' (blue) and 'Other' (orange).


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. At the top, there's a title bar with a download icon and the text 'Caching' and 'Configure how devices use this caching server.' To the right of the window is a toggle switch labeled 'ON'. Below the title bar, there's a dropdown menu 'Cache content for clients connecting from:' with 'all networks' selected. Below that is a section 'Serve clients with public addresses:' with a dropdown menu showing '✓ matching this server's network' and 'on other networks'. Below this is a large empty box with the text 'Click (+) to add networks'. At the bottom left of the window is a '+ -' button and a 'Create a new network' button. At the bottom right is a 'Client Configuration...' button. At the very bottom are 'Cancel' and 'OK' buttons. In the background, there's a sidebar with 'Acces', 'Sta', 'Per', 'Settin', 'Volu', 'Cac', and '25 GB'. The main area shows a progress bar from 0 to 750 GB, with 'Unlimited' at the end. Below the progress bar is a 'Usage' section with 'Cache Used: 5.58 GB used' and a 'Reset...' button. At the bottom is a horizontal bar with 'Mac Software' in blue and 'Other' in orange.

Caching
Configure how devices use this caching server.

Cache content for clients connecting from: all networks

Serve clients with public addresses: ✓ matching this server's network
on other networks

Click (+) to add networks

+ -

Create a new network

Client Configuration...

Cancel OK

Cache Used: 5.58 GB used

Mac Software Other

Caching in non-NAT networks

The screenshot shows 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 "Client Configuration..." button. Below this, there is a "Usage" section showing "Cache Used: 5.58 GB used" and a bar chart with "Mac Software" (blue) and "Other" (orange) categories. A "Reset..." button is also present.

On the right side of the interface, there is a toggle switch labeled "ON" and several "Edit..." buttons.

What is `_aaplcache._tcp`?

- DNS Service Discovery (DNS-SD)
- `man dns-sd`
- example: `_caldavs._tcp.www.example.com.SRV`
- troubleshooting
 - `dig _aaplcache._tcp.caching.apple.com.TXT`
 - `dns-sd -q _aaplcache._tcp.caching.apple.com.TXT`
- Edit Library/Server/named/db.<domain name>

Advanced Options

- serveradmin
 - settings caching (some items are unchangeable)
 - fullstatus caching (more information than usual)
- edit Library/Server/Caching/Config/Config.plist
 - better for setting range values
 - large amount of base64 encoded information (certificate)
 - 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.

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 addresses

- Auto-rollover (for increased system reliability)
- Load balancing (for maximum bandwidth efficiency)
 - weighted
 - round robin
- Caching server checks with Apple every 55 minutes (reporting home IP and public IP)
- Protocol binding isn't a solution for caching service
- Only feasible solution (for now) seems to be to dedicate a public IP address to a caching server

Proper configuration of DNS...

- Historically DNS server and FQDN hostname needed to be matched before server install and configuration
- Typical tricks included:
 - bribing the DNS administrator
 - reserving correct IP for the server in DHCP
 - `changeip -checkhostname`
- Now (since 10.7) when configuring a server:
 - If reverse DNS mismatches, create a minimal DNS
 - Also happens when changing the FQDN hostname

Minimal DNS...

- A DNS Zone in which the FQDN of the server matches the Zone domain
- Machine Record (A) that matches the server FQDN
- Reverse Record (PTR) that matches the server home IP address
- Forwarding server set to whatever the computer's DNS was at the time of naming of the server
- Network configuration of the computer DNS set to 127.0.0.1 plus the DNS at the time of the naming

Minimal DNS...

Server

Host Name: ● Caching-Server.local

[Learn about accessing this server over the internet](#) ➕

Computer Name: ● Caching Server

Your server is available at this address on the local network.

Internet: ● Reachable at 24.172.207.238, no services available

Last updated Today, 4:37 PM.

Info

Running for: 1 day, 1 hour, 54 minutes

System Version: OS X 10.10.2 (Build 14C109)

Server Version: Server 4.0.3 (Build 14S350)

Networks

Ethernet 1: 192.168.2.78


Minimal DNS...

Change Host Name

Devices use your host name to access services on your server.

After changing your host name, devices currently using services may need to be reconfigured.

Click Next to begin.



Cancel

Previous

Next

Networks

Minimal DNS...

Accessing your Server

Choose how users will access your server:

☐ Local Network
Access your server on the local network with a host name ending in ".local". Your server will not be accessible outside of your local network.

☐ Local Network and VPN
Access your server on the local network with a host name ending in ".private". Users can also access your server using a Virtual Private Network (VPN).

☒ Internet
Access your server on both the local network and over the Internet with a registered domain name.
[Learn about registering a domain name](#) ➔

[?](#)

Networks

Minimal DNS...

Connecting to your Server

Enter a computer name and host name.


Computer Name:


The name that users will see in Finder or when connecting on the local network.

Host Name:

Enter the domain name you registered for this server, such as "server.example.com".

Network Address: 192.168.2.78 on Ethernet 1





Networks

Minimal DNS...

Connecting to your Server

Enter a computer name and host name.

Computer Name:

The name that users will see in Finder or when connecting on the local network.

Host Name:

Enter the domain name you registered for this server, such as "server.example.com".

Network Address: 192.168.2.78 on Ethernet 1


Networks

Minimal DNS...

Connecting to y

Enter a comp

Compute

 **Are you sure you want to change your server's host name?**

Changing your server's host name may cause running services to stop working correctly.

Cancel Change Host Name

The name that users will see in Finder or when connecting on the local network.

Host Name:

Enter the domain name you registered for this server, such as "server.example.com".

Network Address: 192.168.2.78 on Ethernet 1

Networks

Minimal DNS...

Connecting to y

Enter a comp

Compute

**Do you want to set up DNS?**

Server can automatically set up a DNS server that resolves your host name. Devices configured to use your server for DNS will be able to access your server using your host name. This will affect your server's network settings.

Host Name:

Enter the domain name you registered for this server, such as "server.example.com".

Network Address: 192.168.2.78 on Ethernet 1

Networks

Minimal DNS...

Server

Host Name: ● caching-server.tarnyinc.com
[Learn about accessing this server over the internet](#) ⓘ

Computer Name: ● Caching Server
[Your server is available at this address on the local network.](#)

Internet: ● Reachable at 24.172.207.238, no services available
[Last updated Today, 4:37 PM.](#)

Info

Running for: 1 day, 1 hour, 57 minutes


System Version: OS X 10.10.2 (Build 14C109)

Server Version: Server 4.0.3 (Build 14S350)

Networks

Ethernet 1: 192.168.2.78

Minimal DNS...

 DNS ON

Access

Status: ● Set your network DNS settings to 192.168.2.78 to use this server
[Learn about configuring this service](#)

Permissions: All Networks Edit...

Settings

Forwarding Servers: 192.168.2.20 Edit...

☒ Perform lookups for only some clients ⌵ Edit...

Records

| | |
|---|-----------------|
| Primary Zone: caching-server.tarnyinc.com | |
| caching-server.tarnyinc.com | machine |
| caching-server.tarnyinc.com | nameserver |
| Reverse Zone: 78.2.168.192.in-addr.arpa | |
| 192.168.2.78 | reverse mapping |
| caching-server.tarnyinc.com | nameserver |
| | |
| | |

Minimal DNS

- Is this good or bad? Depends upon your environment.
- We used to recommend avoiding it, but now...
- Do you have control of your DNS records for your server's IP address?
- Probably good for “islands” of Macs in PC/Windows organizations
- Probably good for SOHO
- Usually a Mac OS X Server is an internal only DNS

Proper configuration of DNS (cont)

- Set your public DNS records carefully (A, CNAME, MX, etc...) This is how the world finds your servers
- Purchasing a domain is not enough. Public DNS hosting companies, registrars, etc are necessary
- Most OS X Servers are *not* publicly accessible
 - Beware of becoming an open resolver
 - Use the access controls to avoid open resolver

DNS tricks and approaches

- Your internal DNS is your own name space
- Multiple domain names per IP address, common for web hosting
- Multiple IP addresses for one FQDN, load balancing
- Primary & Secondary DNS Server configuration
 - Primary Zone -“allow zone transfers”
 - Secondary Zone -“Add Secondary Zone...”
 - Don’t forget the reverse zone
- An Open Directory Replica is a good candidate for a Secondary DNS server *because directory services relies upon DNS*

Enhance Server Performance

- Link Aggregate interface for x2 (or more) bandwidth
 - Thunderbolt Ethernet Adapter
 - Create new Virtual Interface
- Access Controls to limit access by
 - Networks
 - Users/Groups
- 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/>
- <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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