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## Pre-Installation

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## Network Provisioning

Using all lower case names is highly recommended and required by multiple specifications.

Be very careful changing these settings as it could create problems such as services failing to start.

**Host Name:** sesamserver

- Should be One word
- Should not contain a period or space
- test with the command "hostname"  
(hostname sesamserver)
- reboot required after changing hostname

**Fully Qualified Domain Name / FQDN:** sesamserver.example.com

- Must end with a period and valid tld (.com)
- test with command "ping \$HOST\_NAME"  
(ping sesamserver)
- test with command "ping \$HOST\_NAME.\$DOMAIN\_NAME"  
(ping sesamserver.example.com)
- **Reverse dns or PTR record required** for servers and remote media pools

**Hosts File:** /etc/hosts or c:\windows\system32\drivers\etc\hosts

- Must start with and contain only "127.0.0.1 localhost"

**Deprecated - Emulation of DNS with hosts files**

- Must start with "127.0.0.1 localhost"
- Next entry must be "IP HOST\_NAME.DOMAIN\_NAME HOST\_NAME"
- ex. (192.168.1.2 sesamserver.sepusa.com sesamserver)
- if there are entries for other interfaces, use unique host names  
ex. (192.168.2.2 backupinterface-sesamserver.sepusa.com backupinterface-sesamserver)
- if there are duplicate entries only the first will be used

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## Firewalls

Ports used by SEP Sesam

When using the standard configuration for SEP Sesam the following TCP ports must be open:

Server:

- stpd 11001
- remote-gui 11401

Client:

- ctrl 11301
- data 1024-65535 (can be limited with the custom ports option below)

Standard Connection Process:

1. The Sesam server opens a connection to port 11301 on client
2. The Sesam client opens a connection to port 11001 on Sesam server (or remote device server).
3. The Sesam server opens a connection to a random port above 1024 on the client.

Custom Ports for firewalled/nat/wan/vpn clients:

1. Edit the properties of the client (Components > Topology)
2. Switch to the "Options" tab
3. Add **11003-11010** to specify a port range, 2 ports are required for each stream, these reduce your "data" ports above
4. Enable access to these ports from the sesam server to the client in the client and/or edge firewall(s)

SSH Alternative:

1. Use ssh-genkey (as root on the backup server) to create a key pair, don't use a password. They will be saved by default as /root/.ssh/id.[dr]sa.[prv|pub]
2. To "allow" this key to access the server you will have to transfer it to /root/.ssh/authorized\_keys on the server.
3. Transfer the file with the following command, twice
4. The server ssh client (/etc/ssh/ssh\_config) should consider Compression=Yes and CompressionLevel=6 for optimal VPN/CPU performance

```
root@SEP_SERVER# scp -v /root/.ssh/id.rsa.pub root@SEP_CLIENT:/root/.ssh/authorized_keys.
```

You can use multiple keys in the authorized\_keys file, one on each line.

After this setup you should be able to login to the sep server as root and ssh to the client as root without using a password, set the client properties connection method to ssh and the access option "-s".

"If you are asked for the password on the second attempt there is a problem which may be located in /etc/ssh/sshd\_config as AuthorizedKeysFile=[/dev/null/any/empty/file]"

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# Performance

Modern systems aggregate network channel bandwidth is limited by system bus interfaces only in the case of systems of large scale or cloud/shared environment.

The following charts describe the theoretical maximum channel performance for common network media types.

# Ethernet

## Theoretical Maximums for common devices (Hard Limits)

- The below limits are based on the assumption of managed switching infrastructure and server grade network interface cards.
- 32MB is generally the lower memory limit for server grade managed 1GB switches.
- 1GB network cards typically built into servers are consumer grade and/or contain < 1MB of cache.

### Copper Ethernet:

Interface Type	Bandwidth Megabits	Theoretical Maximum Gigabytes per Hour	GB Per 24 Hour Period
Shared T1	1	0.44	10.55
T1	1.5	0.66	15.82
E1	2	0.88	21.09
MultiLink T1	3	1.32	31.64
MultiLink T1	4	1.76	42.19
MultiLink T1	5	2.20	52.73

MultiLink T1	6	2.64	63.28
MultiLink T1	7	3.08	73.83
MultiLink T1	8	3.52	84.38
MultiLink T1	9	3.96	94.92
Fast Ethernet	10	4.39	105.47
Cable Modem / DSL	11	4.83	116.02
Cable Modem / DSL	12	5.27	126.56
Cable Modem / DSL	13	5.71	137.11
Cable Modem / DSL	14	6.15	147.66
Cable Modem / DSL	15	6.59	158.20
Cable Modem / DSL	16	7.03	168.75
Cable Modem / DSL	17	7.47	179.30
Cable Modem / DSL	18	7.91	189.84
Cable Modem / DSL	19	8.35	200.39
Cable Modem / DSL	20	8.79	210.94
Cable Modem / DSL	21	9.23	221.48
Cable Modem / DSL	22	9.67	232.03
Cable Modem / DSL	23	10.11	242.58
Cable Modem / DSL	24	10.55	253.13
Cable Modem / DSL	25	10.99	263.67
Cable Modem / DSL	26	11.43	274.22
Cable Modem / DSL	27	11.87	284.77
Cable Modem / DSL	28	12.30	295.31
Cable Modem / DSL	29	12.74	305.86
Cable Modem / DSL	30	13.18	316.41
Cable Modem / DSL	40	17.58	421.88
WAN	45	19.78	474.61
WAN	50	21.97	527.34
WAN	55	24.17	580.08
100 Mbt	100	43.95	1,054.69
Bonded / Trunked 100 Mbt	200	87.89	2,109.38
Bonded / Trunked 100 Mbt	300	131.84	3,164.06
Bonded / Trunked 100 Mbt	400	175.78	4,218.75
Bonded / Trunked 100 Mbt	500	219.73	5,273.44
Bonded / Trunked 100 Mbt	600	263.67	6,328.13
Bonded / Trunked 100 Mbt	700	307.62	7,382.81
Bonded / Trunked 100 Mbt	800	351.56	8,437.50
Bonded / Trunked 100 Mbt	900	395.51	9,492.19
1GB Ethernet	1000	125.56	3,013.39
Bonded / Trunked 1GB Ethernet	2000	199.57	4,789.68
Bonded / Trunked 1GB Ethernet	3000	299.35	7,184.52
Bonded / Trunked 1GB Ethernet	4000	399.14	9,579.36
Bonded / Trunked 1GB Ethernet	5000	498.92	11,974.20
Bonded / Trunked 1GB Ethernet	6000	598.71	14,369.04
Bonded / Trunked 1GB Ethernet	7000	698.49	16,763.88
Bonded / Trunked 1GB Ethernet	8000	798.28	19,158.72
Bonded / Trunked 1GB Ethernet	9000	898.06	21,553.56

10GB Ethernet	10000	1,255.58	30,133.93
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Special Considerations:

Jumbo frame support os,nic,switches,vm?  
Offloading support in os,nic,vm?  
Often bonding more than 1 or 2, 1GB interface(s) per core is actually slower  
For best results bond at maximum 8 1GB channels

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## Fibre Channel

Spec	Medium	Maximum Performance
Fibre Channel - 2GB	2GFC	212.5 MB/s
4GB	4GFC	425 MB/s
8GB	8GFC	850 MB/s
FC over 10GbE	FCoE	1250 MB/s

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## 10GbE and Infiniband 4x

Spec	Medium	Maximum Performance
AOE	10GbE	1250 MB/s
iSCSI	10GbE	1250 MB/s
FCoE	10GbE	1250 MB/s
iSCSI	InfiniBand 4x	5000 MB/s

## Bonded Ethernet

Linux has built-in support for automatic independent bidirectional load balancing using Ethernet devices of any link speed **without switch support**.

Cisco Switches prefer the following settings:

- Linux bonding mode 802.3ad with xmit\_hash\_policy=layer3+4
- Switch trunking mode etherchannel/lacp-slow with layer3+4
- Link speed must be the same on all 'enslaved' interfaces
- Each interface should have no ip address configured
- Each interface should show very similar (TX+RX) values.
- [Cisco Config Details](#) <sup>[1]</sup>

The only commonly available mode which provides bidirectional support is mode 6 (balance-alb).

Do not use the modes other than 6 (balance-alb) if you plan to enhance performance of the system without sacrificing reliability or requiring a specific switch configuration.

Bond devices and their 'slave(s)' usually can't be members of bridges that run stp.  
Bond devices can sometimes use significant (Multi-MB) amounts of memory.  
Special considerations need to be made when using devices of different link speeds (10/100Mbt+1000Mbt)

Your specific Linux distribution most likely provides a tool to configure bonding so you won't need and shouldn't use the command line example and background information below.

- [SLES](#) <sup>[2]</sup>
- [SLES XEN](#) <sup>[3]</sup>
- [Other/Generic](#) <sup>[4]</sup>

## Example driver setup for one bond interface.

Configure the `/etc/modules(.conf)` or `/etc/modprobe.conf(.local)` as follows:

- `alias bond0 bonding`
- `options bond0 -o bond0 mode=6 miimon=100`

## Start Script for 2 ethernet interfaces (startbond0.sh)

- `#!/bin/sh`
- `##modprobe bond0`
- `ifconfig bond0 192.168.0.10 netmask 255.255.255.0 up`
- `route add default gw 192.168.0.1`
- `ifconfig eth0 0.0.0.0 up`
- `ifconfig eth1 0.0.0.0 up`
- `ifenslave bond0 eth0 eth1`

Bonding in (**mode=balance-alb**), Adaptive load balancing includes `balance-tlb` plus receive load balancing (`rlb`) for IPV4 traffic, and does not require any special switch support. The receive load balancing is achieved by ARP negotiation. The bonding driver intercepts the ARP Replies sent by the local system and overwrites the source hardware address with the unique hardware address of one of the "enslaved Ethernet devices" in the bond such that different peers use different hardware addresses for the server, the algorithm `layer3+4` and based on "ip:port". This bonding can enable a single tcp connection to saturate multiple gigabit ethernet links with full fault tolerance without connection drops under single or sometimes multiple port/cable/switch and/or gateway failures.

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## Storage

Storage

## Calculating Needs

This page shows an example calculation

( assuming 5 daily full backups, 1 weekly full and 1 monthly full)

Example:

Smaller Servers:  $27 * 4TB = 96$

Larger Servers:  $8 * 8TB = 64$

Total TB = 160 for site/backup day

for daily(5 days) , weekly and monthly:

$size = 160TB$

$(size * 5) + (size * 1) + (size * 1)$

$800 + 160 + 160 = 1120TB$  Site wide Pool Size

For smaller servers:

$size = 4TB$

$(size * 7) = 28TB$  Pool size

For larger servers:

$size = 8TB$

$(size * 7) = 56TB$  Pool size

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## Rotation Example

This article details the setup of a standard GFS tape rotation scheme, while trying to keep each day's data on it's own tape if there is room.

Phase 1 is to create the media pools and set the lock date / EOL, Phase 2 is to setup media initialization tasks to do the actual rotation. By default Sesam will append all days at the tape `daily00001` until it's full.

#### Requirements:

- SEP Sesam with a valid license
- 20 tapes (assuming an entire network wide full backup fits on one tape)

#### Phase 1: Create 3 New media pools:

1. Daily - Initialize 4 Tapes and set lock time / EOL to 4 days
  - Daily00001 for Monday
  - Daily00002 for Tuesday
  - Daily00003 for Wednesday
  - Daily00004 for Thursday
2. Weekly - Initialize also 4 Tapes and set lock time / EOL to 27 days
  - Weekly00001 for First Friday
  - Weekly00002 for Second Friday
  - Weekly00003 for Third Friday
  - Weekly00004 for Fourth Friday
3. Monthly - Initialize 12 Tapes and set lock time / EOL to 360 days.
  - Monthly00001 for January
  - Monthly00002 for February
  - Monthly00003 for March
  - Monthly00004 for April
  - Monthly00005 for May
  - Monthly00006 for June
  - Monthly00007 for July
  - Monthly00008 for August
  - Monthly00009 for September
  - Monthly00010 for October
  - Monthly00011 for November
  - Monthly00012 for December

#### Phase 2: Create 2 Media Events for media initialization (closing tapes)

1. Set up a scheduled mediainit for MON,TUE,WED,THU with the media pool "Daily" at e.g. 12 pm.
2. Set up a scheduled mediainit for FRIDAY with the media pool "Weekly" at e.g. 12 pm.

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## EOL/EOM Restrictions

All Media EOM means that all media are full of data within the EOL retention period.

If we do have enough space in the media pool for a full of each task plus incremental tasks until another full is complete it's likely one or more of the tasks didn't get a successful full backup before the incremental tasks ran.

#### Working Example:

10GB full (Last Sunday)  
1GB INC each 6 other days  
10GB full (This Sunday)  
Total space required in media pool: 26GB

#### Broken Example:

no full yet, 10G INC (Last Sunday)  
10GB inc each 6 other days  
10GB (this sunday)  
Total space required in media pool: 80G

All Media EOL means that the retention period on the media pool is holding back the media from being writable.

Check your media pool lock period in the media pool properties. If you reduce the lock time on the media pool make sure to adjust the lock dates on the individual media as well.

## Reformatting a tape

To "Re Format" a tape in the GUI:

- Open Components

- Open Media
- Select the media you wish to re-format
- Select Properties
- edit the lock date if it is listed in the future
- Select Properties again
- Click Delete

You are now ready to re-initialize the media, **remember to check the overwrite box if you are using tape media.**

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## A/V Excludes

Backups can often be enhanced for higher reliability and performance by excluding the following files and folders from anti-virus and anti-malware scanners:

### Linux:

```

/opt/sesam/bin/sesam/sbc (sesam-client)
/opt/sesam/bin/sesam
/var/opt/sesam/var
/var/opt/sesam/var/work
/var/opt/sesam/var/log
/var/opt/sesam/var/tmp
  
```

### Windows:

```

C:\Program Files\SEPsasam\bin\sasam\sbc (sesam-client)
C:\Program Files\SEPsasam\bin\sasam
C:\Program Files\SEPsasam\var
C:\Program Files\SEPsasam\var\work
C:\Program Files\SEPsasam\var\log
C:\Program Files\SEPsasam\var\tmp
  
```

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 Hosted By: [JuniperBeach.Net](http://JuniperBeach.Net)

Source URL (retrieved on *Mar 6 2012 - 4:38pm*): <http://sepusa.com/node/3727>

- Links:
- [1] [http://www.cisco.com/en/US/docs/ios/12\\_2sb/feature/guide/sbcelacp.html](http://www.cisco.com/en/US/docs/ios/12_2sb/feature/guide/sbcelacp.html)
  - [2] [http://www.novell.com/support/search.do?cmd=displayKC&docType=kc&externalId=3815448&slicId=1&docTypeID=DT\\_TID\\_1\\_1&dialogID=65200162&stateId=0%20%2020120650689](http://www.novell.com/support/search.do?cmd=displayKC&docType=kc&externalId=3815448&slicId=1&docTypeID=DT_TID_1_1&dialogID=65200162&stateId=0%20%2020120650689)
  - [3] <http://www.novell.com/cool solutions/feature/19955.html>
  - [4] <http://www.linuxfoundation.org/collaborate/workgroups/networking/bonding>