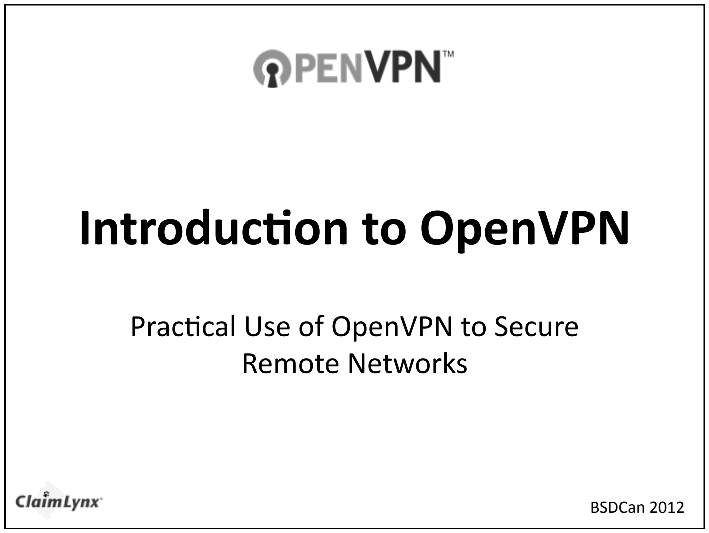
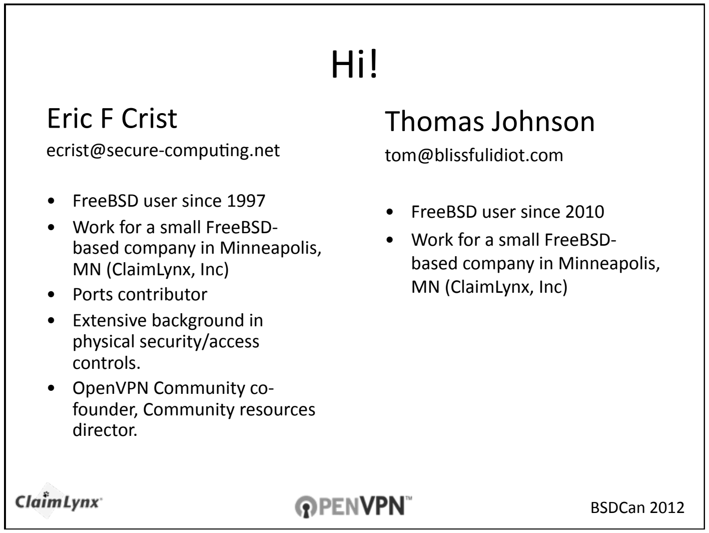


Introduction to OpenVPN

Practical Use of OpenVPN to Secure
Remote Networks

BSDCan 2012



Hi!

Eric F Crist
ecrist@secure-computing.net

- FreeBSD user since 1997
- Work for a small FreeBSD-based company in Minneapolis, MN (ClaimLynx, Inc)
- Ports contributor
- Extensive background in physical security/access controls.
- OpenVPN Community co-founder, Community resources director.

Thomas Johnson
tom@blissfulidiot.com

- FreeBSD user since 2010
- Work for a small FreeBSD-based company in Minneapolis, MN (ClaimLynx, Inc)

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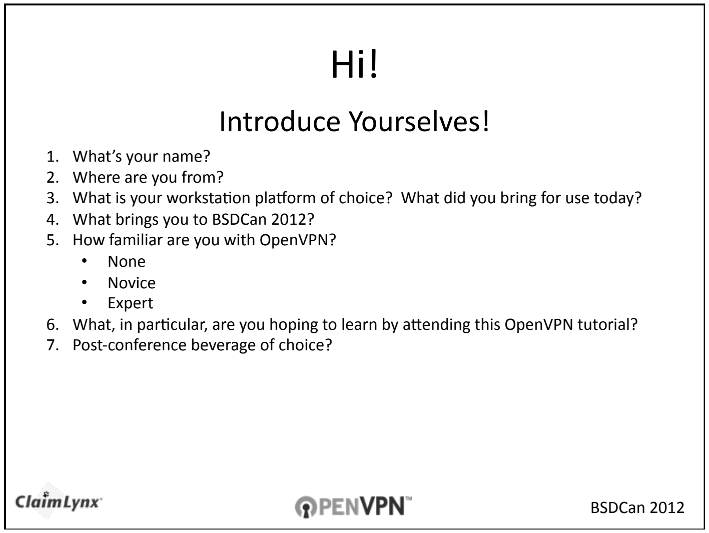

Hi!

Introduce Yourselves!

1. What's your name?
2. Where are you from?
3. What is your workstation platform of choice? What did you bring for use today?
4. What brings you to BSDCan 2012?
5. How familiar are you with OpenVPN?
    - None
    - Novice
    - Expert
6. What, in particular, are you hoping to learn by attending this OpenVPN tutorial?
7. Post-conference beverage of choice?

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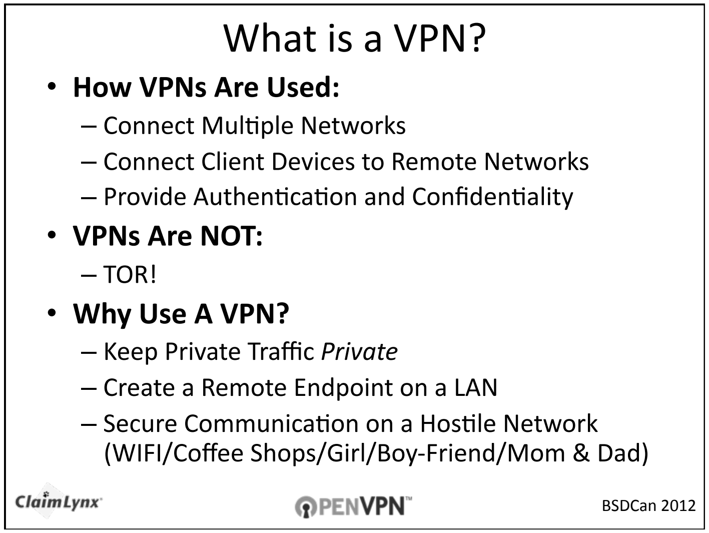

What is a VPN?

- **How VPNs Are Used:**
    - Connect Multiple Networks
    - Connect Client Devices to Remote Networks
    - Provide Authentication and Confidentiality
- **VPNs Are NOT:**
    - TOR!
- **Why Use A VPN?**
    - Keep Private Traffic *Private*
    - Create a Remote Endpoint on a LAN
    - Secure Communication on a Hostile Network (WIFI/Coffee Shops/Girl/Boy-Friend/Mom & Dad)

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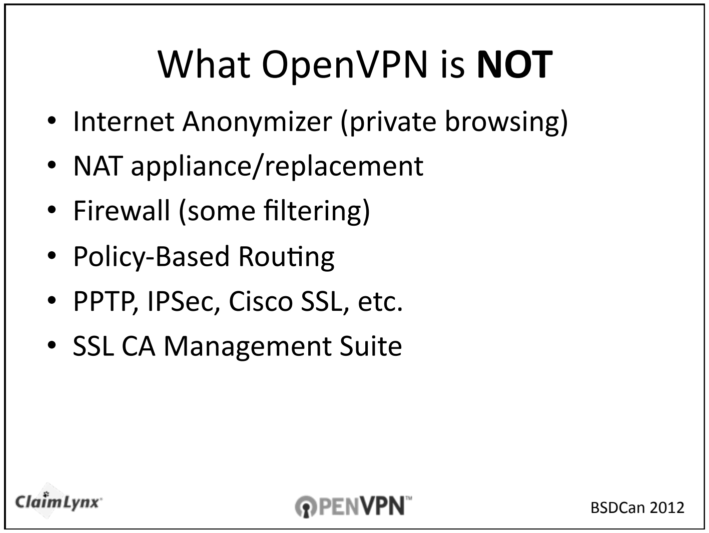

What OpenVPN is **NOT**

- Internet Anonymizer (private browsing)
- NAT appliance/replacement
- Firewall (some filtering)
- Policy-Based Routing
- PPTP, IPSec, Cisco SSL, etc.
- SSL CA Management Suite

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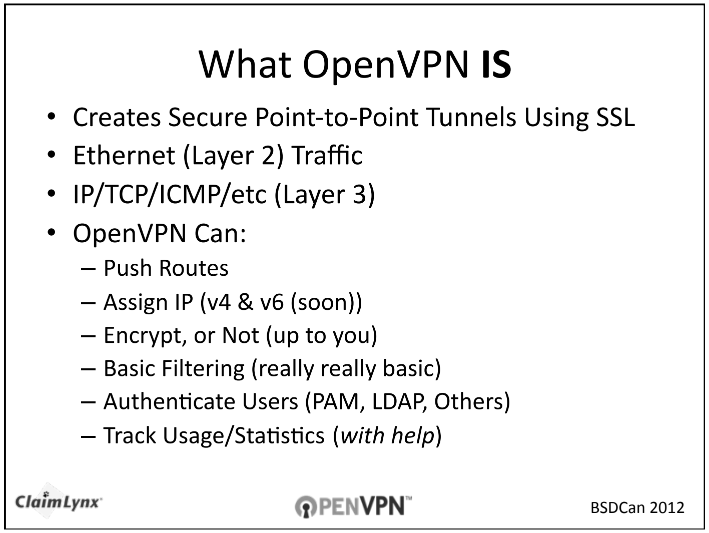

What OpenVPN **IS**

- Creates Secure Point-to-Point Tunnels Using SSL
- Ethernet (Layer 2) Traffic
- IP/TCP/ICMP/etc (Layer 3)
- OpenVPN Can:
  - Push Routes
  - Assign IP (v4 & v6 (soon))
  - Encrypt, or Not (up to you)
  - Basic Filtering (really really basic)
  - Authenticate Users (PAM, LDAP, Others)
  - Track Usage/Statistics (*with help*)

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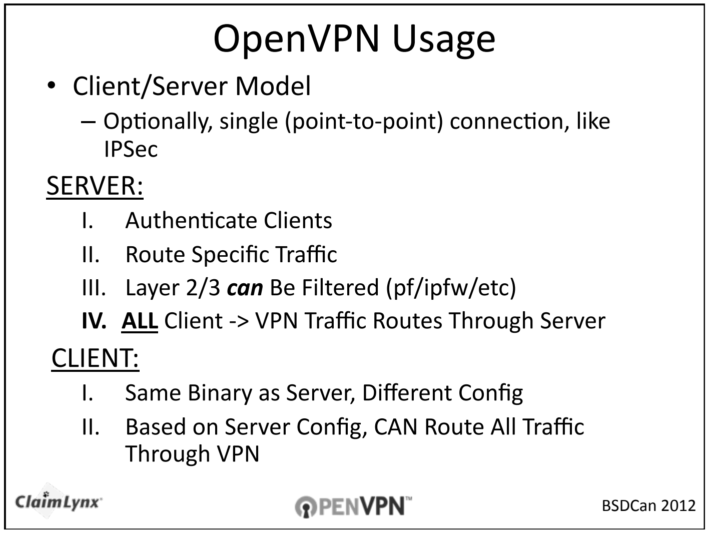

OpenVPN Usage

- Client/Server Model
  - Optionally, single (point-to-point) connection, like IPSec

<u>SERVER:</u>

I. Authenticate Clients
II. Route Specific Traffic
III. Layer 2/3 ***can*** Be Filtered (pf/ipfw/etc)
IV. **<u>ALL</u>** Client -> VPN Traffic Routes Through Server

<u>CLIENT:</u>

I. Same Binary as Server, Different Config
II. Based on Server Config, CAN Route All Traffic Through VPN

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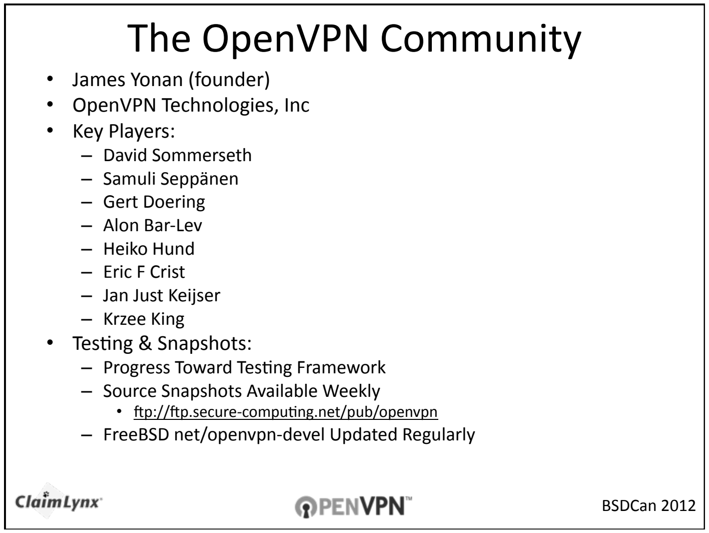

The OpenVPN Community

- James Yonan (founder)
- OpenVPN Technologies, Inc
- Key Players:
  - David Sommerseth
  - Samuli Seppänen
  - Gert Doering
  - Alon Bar-Lev
  - Heiko Hund
  - Eric F Crist
  - Jan Just Keijser
  - Krzee King
- Testing & Snapshots:
  - Progress Toward Testing Framework
  - Source Snapshots Available Weekly
    - ftp://ftp.secure-computing.net/pub/openvpn
  - FreeBSD net/openvpn-devel Updated Regularly

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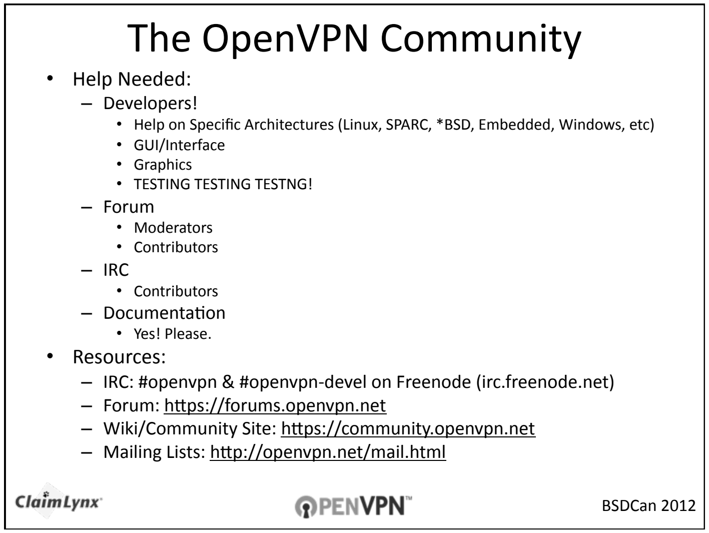

The OpenVPN Community

- Help Needed:
  - Developers!
    - Help on Specific Architectures (Linux, SPARC, *BSD, Embedded, Windows, etc)
    - GUI/Interface
    - Graphics
    - TESTING TESTING TESTNG!
  - Forum
    - Moderators
    - Contributors
  - IRC
    - Contributors
  - Documentation
    - Yes! Please.
- Resources:
  - IRC: #openvpn & #openvpn-devel on Freenode (irc.freenode.net)
  - Forum: https://forums.openvpn.net
  - Wiki/Community Site: https://community.openvpn.net
  - Mailing Lists: http://openvpn.net/mail.html

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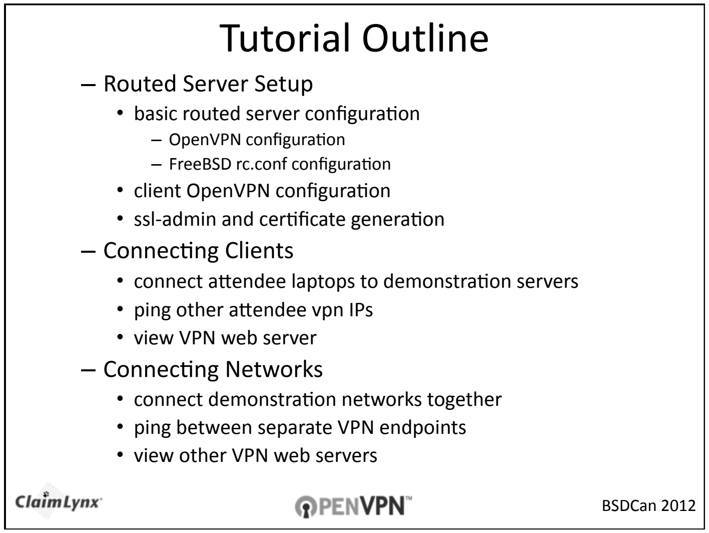

Tutorial Outline

- Routed Server Setup
  - basic routed server configuration
    - OpenVPN configuration
    - FreeBSD rc.conf configuration
  - client OpenVPN configuration
  - ssl-admin and certificate generation
- Connecting Clients
  - connect attendee laptops to demonstration servers
  - ping other attendee vpn IPs
  - view VPN web server
- Connecting Networks
  - connect demonstration networks together
  - ping between separate VPN endpoints
  - view other VPN web servers

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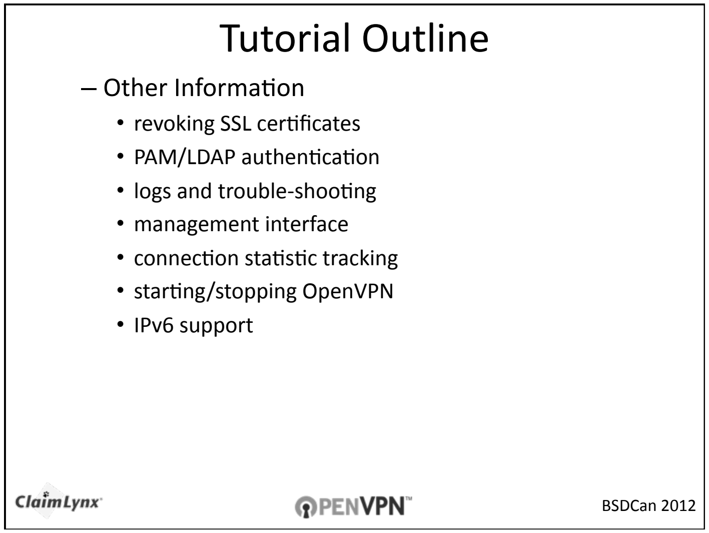

Tutorial Outline

- Other Information
  - revoking SSL certificates
  - PAM/LDAP authentication
  - logs and trouble-shooting
  - management interface
  - connection statistic tracking
  - starting/stopping OpenVPN
  - IPv6 support

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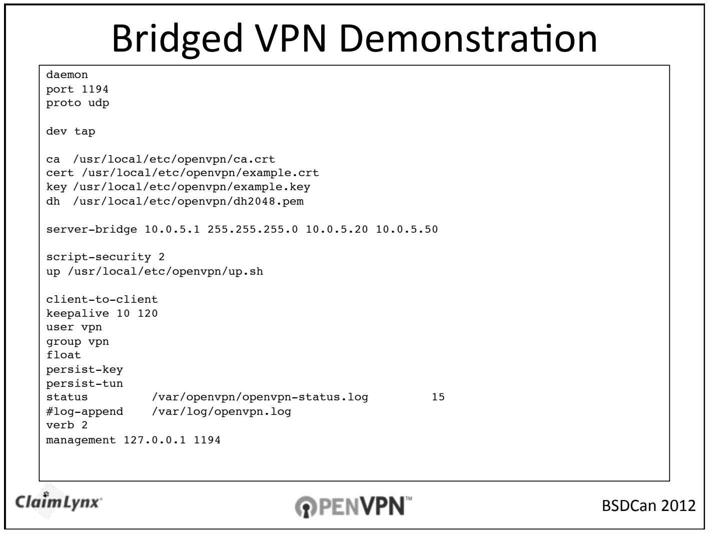

Bridged VPN Demonstration

```
daemon
port 1194
proto udp

dev tap

ca  /usr/local/etc/openvpn/ca.crt
cert /usr/local/etc/openvpn/example.crt
key /usr/local/etc/openvpn/example.key
dh  /usr/local/etc/openvpn/dh2048.pem

server-bridge 10.0.5.1 255.255.255.0 10.0.5.20 10.0.5.50

script-security 2
up /usr/local/etc/openvpn/up.sh

client-to-client
keepalive 10 120
user vpn
group vpn
float
persist-key
persist-tun
status        /var/openvpn/openvpn-status.log        15
#log-append   /var/log/openvpn.log
verb 2
management 127.0.0.1 1194
```

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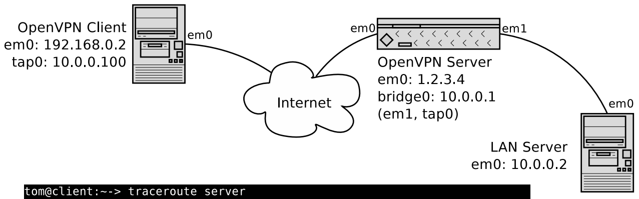
Bridged VPN Demonstration

```
#!/bin/sh
/sbin/ifconfig tap0 up
```

```
cloned_interfaces="bridge0 tap0"
ifconfig_bridge0="inet 10.0.5.1 netmask 255.255.255.0 addm em0 addm tap0 up"
ifconfig_bridge0_alias0="10.0.5.4/16"
ifconfig_tap0="up"
```

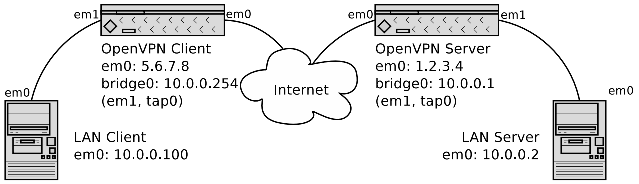
- Primary problem with bridged setups is tap0 isn't 'up' administratively.
- Passes all ethernet frames, potential for broadcast storms/loops!

Bridged VPN Demonstration



```
tom@client:~-> traceroute server
traceroute to server.example.org (10.0.0.2), 64 hops max, 52 byte packets
 1  server (10.0.0.2)  2.153 ms  13.707 ms  0.979 ms
```

Bridged VPN Demonstration



```
tom@lanclient:~-> traceroute server
traceroute to server.example.org (10.0.0.2), 64 hops max, 52 byte packets
 1  server (10.0.0.2)  2.153 ms  13.707 ms  0.979 ms
```

Tutorial WiFi

bsdcant_pub: **bsdcan_openvpn**

bsdcant_XX: **bsdcan_openvpn**

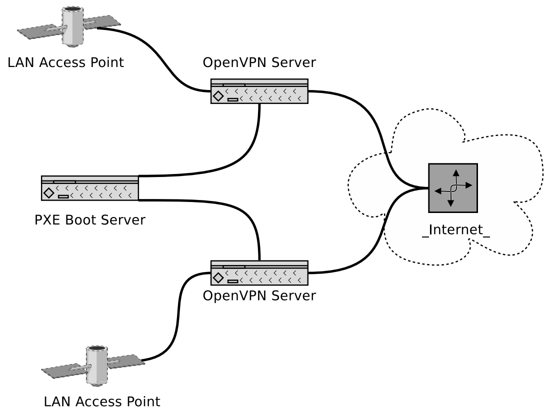
srv.v1XX.example.org – Server

lan.v1XX.example.org – LAN IP

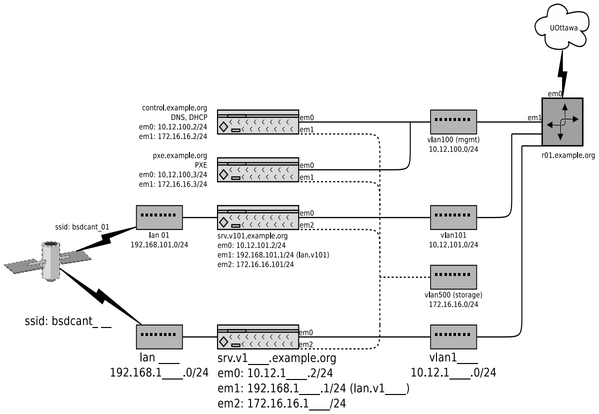
User: root

Pass: password

Tutorial Network Overview



Tutorial Network Overview



LAB 1: Client → Server

1) Create OpenVPN server/client configuration
2) ssl-admin: setup & generate certificates
3) Install client and certificates on group machines
4) Connect to VPN and test

LAB 1: Client → Server

/usr/local/etc/openvpn/server.conf

```
daemon
port 1194
proto udp

dev tun

ca  /usr/local/etc/openvpn/ca.crt
cert /usr/local/etc/openvpn/openvpn-server.crt
key /usr/local/etc/openvpn/openvpn-server.key
dh  /usr/local/etc/openvpn/dh1024.pem

server 10.60.VLAN.0 255.255.255.0
push "route 192.168.1VLAN.0 255.255.255.0"
topology net30
script-security 2

crl-verify /usr/local/etc/ssl-admin/prog/crl.pem
keepalive 10 120
float
persist-key
persist-tun
status /var/log/openvpn-status.log    15
verb 5
management 127.0.0.1 1194
```

LAB 1: Client → Server

/usr/local/etc/openvpn/client.conf

```
client
dev tun
proto udp
remote srv.v1VLAN.example.org
resolv-retry infinite
nobind
persist-key
persist-tun
remote-cert-tls server
ca ca.crt
cert client.crt
key client.key
verb 3
```

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LAB 1: Client → Server

- ssl-admin
  - Easy-RSA is included with OpenVPN, but it sucks.
  - security/ssl-admin
    - Fast, interactive.
    - No bulk support (yet)
    - Written in Perl
    - Maintains CRL
    - Can bundle certificate, key, CA cert, and OpenVPN config

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LAB 1: Client → Server

Edit ssl-admin.conf:

```
## Set default values here.
#
# The following values can be changed without affecting
# your CA key.

$ENV{'KEY_SIZE'} = "1024";
$ENV{'KEY_DAYS'} = "3650";
$ENV{'KEY_CN'} = "";
$ENV{'KEY_CRL_LOC'} = "URI:http://srv.v1XX.example.org/crl.pem";


## WARNING!!! ##
#
# Changing the following values has vast consequences.
# These values must match what's in your root CA certificate.

$ENV{'KEY_COUNTRY'} = "CA";
$ENV{'KEY_PROVINCE'} = "Ontario";
$ENV{'KEY_CITY'} = "Ottawa";
$ENV{'KEY_ORG'} = "BSDCant";
$ENV{'KEY_EMAIL'} = 'root@example.org';
```

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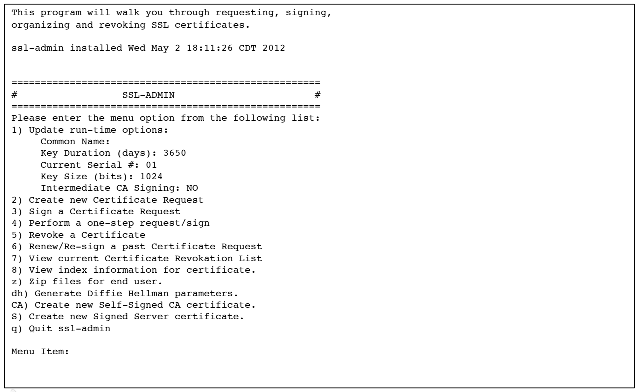
ssl-admin

Main Menu:



```
This program will walk you through requesting, signing,
organizing and revoking SSL certificates.

ssl-admin installed Wed May 2 18:11:26 CDT 2012


=====================================================
#                  SSL-ADMIN                        #
=====================================================
Please enter the menu option from the following list:
1) Update run-time options:
     Common Name:
     Key Duration (days): 3650
     Current Serial #: 01
     Key Size (bits): 1024
     Intermediate CA Signing: NO
2) Create new Certificate Request
3) Sign a Certificate Request
4) Perform a one-step request/sign
5) Revoke a Certificate
6) Renew/Re-sign a past Certificate Request
7) View current Certificate Revokation List
8) View index information for certificate.
z) Zip files for end user.
dh) Generate Diffie Hellman parameters.
CA) Create new Self-Signed CA certificate.
S) Create new Signed Server certificate.
q) Quit ssl-admin

Menu Item:
```

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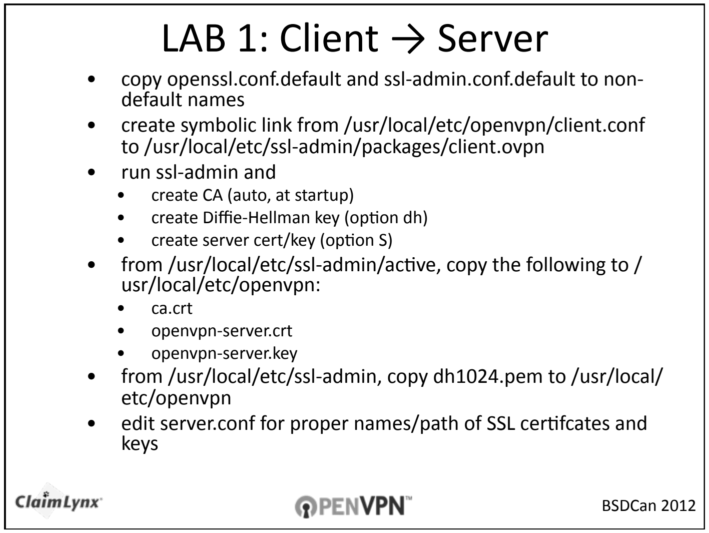

LAB 1: Client → Server

- copy openssl.conf.default and ssl-admin.conf.default to non-default names
- create symbolic link from /usr/local/etc/openvpn/client.conf to /usr/local/etc/ssl-admin/packages/client.ovpn
- run ssl-admin and
  - create CA (auto, at startup)
  - create Diffie-Hellman key (option dh)
  - create server cert/key (option S)
- from /usr/local/etc/ssl-admin/active, copy the following to /usr/local/etc/openvpn:
  - ca.crt
  - openvpn-server.crt
  - openvpn-server.key
- from /usr/local/etc/ssl-admin, copy dh1024.pem to /usr/local/etc/openvpn
- edit server.conf for proper names/path of SSL certifcates and keys

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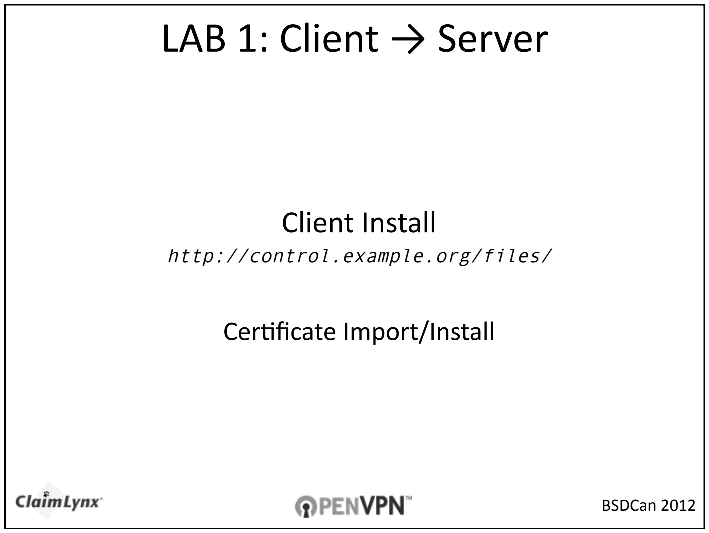

LAB 1: Client → Server

Client Install

`http://control.example.org/files/`

Certificate Import/Install

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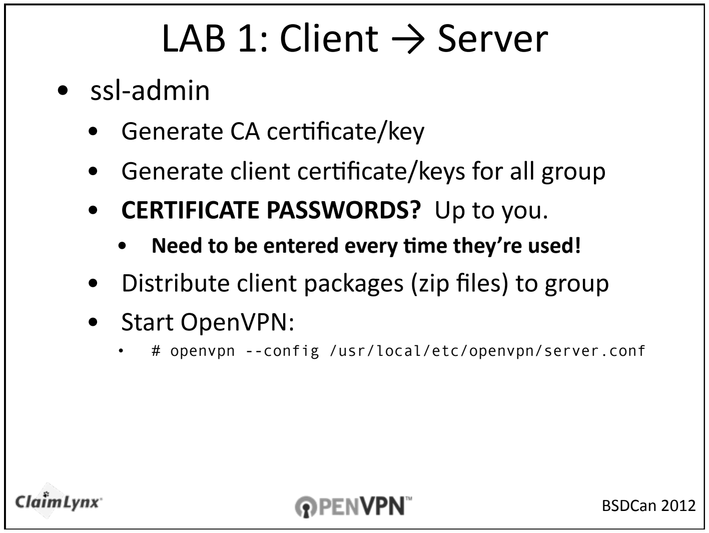

LAB 1: Client → Server

- ssl-admin
  - Generate CA certificate/key
  - Generate client certificate/keys for all group
  - **CERTIFICATE PASSWORDS?** Up to you.
    - **Need to be entered every time they're used!**
  - Distribute client packages (zip files) to group
  - Start OpenVPN:
    - `# openvpn --config /usr/local/etc/openvpn/server.conf`

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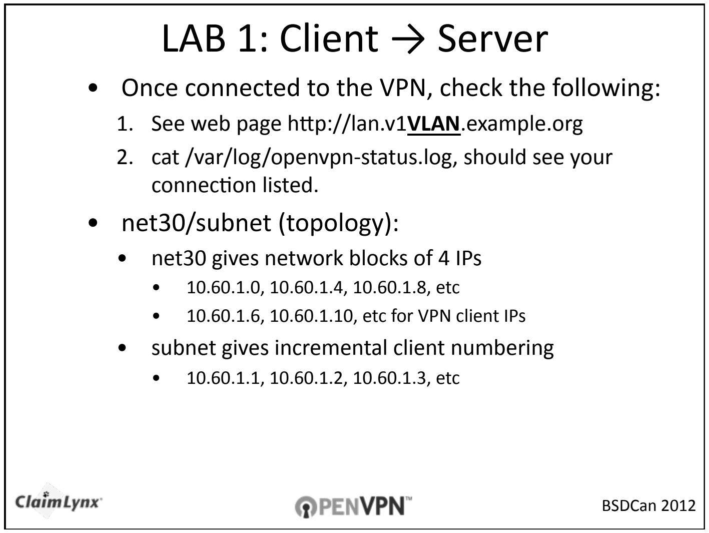

LAB 1: Client → Server

- Once connected to the VPN, check the following:
  1. See web page http://lan.v1**VLAN**.example.org
  2. cat /var/log/openvpn-status.log, should see your connection listed.
- net30/subnet (topology):
  - net30 gives network blocks of 4 IPs
    - 10.60.1.0, 10.60.1.4, 10.60.1.8, etc
    - 10.60.1.6, 10.60.1.10, etc for VPN client IPs
  - subnet gives incremental client numbering
    - 10.60.1.1, 10.60.1.2, 10.60.1.3, etc

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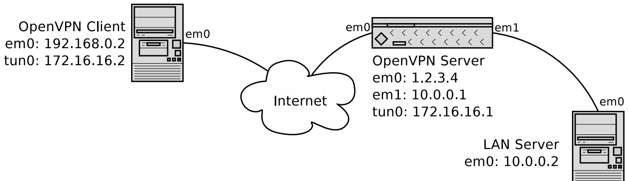
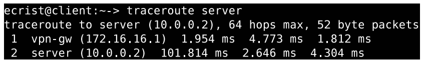
LAB 1: Client → Server

QUESTIONS?



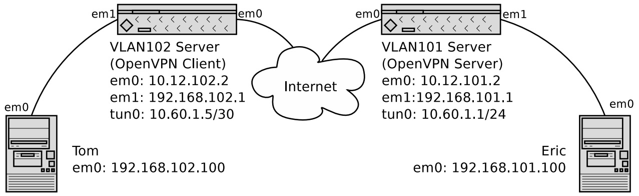


```
ecrist@client:~-> traceroute server
traceroute to server (10.0.0.2), 64 hops max, 52 byte packets
 1  vpn-gw (172.16.16.1)  1.954 ms  4.773 ms  1.812 ms
 2  server (10.0.0.2)  101.814 ms  2.646 ms  4.304 ms
```

LAB 2: Network → Network

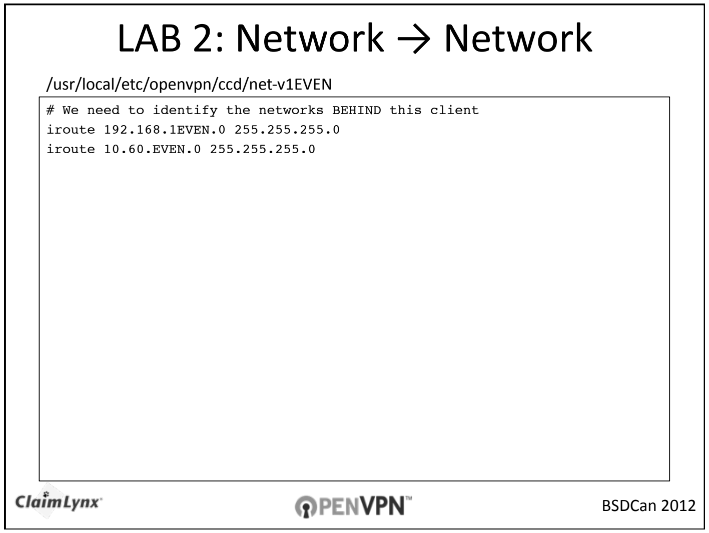
- Groups are 1 & 2, 3 & 4, 5 & 6, etc
  - Odd = server, even = client
- Connect two separate networks with OpenVPN such that the LAN <u>and</u> OpenVPN clients on either network can talk with the LAN and OpenVPN client on the other network

LAB 2: Network → Network



LAB 2: Network → Network

- ssl-admin: create client certificate/key pair for even-group's server
- create client-config-dir and ccd entry for remote network
- update server config to support remote network and ccd



LAB 2: Network → Network

/usr/local/etc/openvpn/ccd/net-v1EVEN

```
# We need to identify the networks BEHIND this client
iroute 192.168.1EVEN.0 255.255.255.0
iroute 10.60.EVEN.0 255.255.255.0
```

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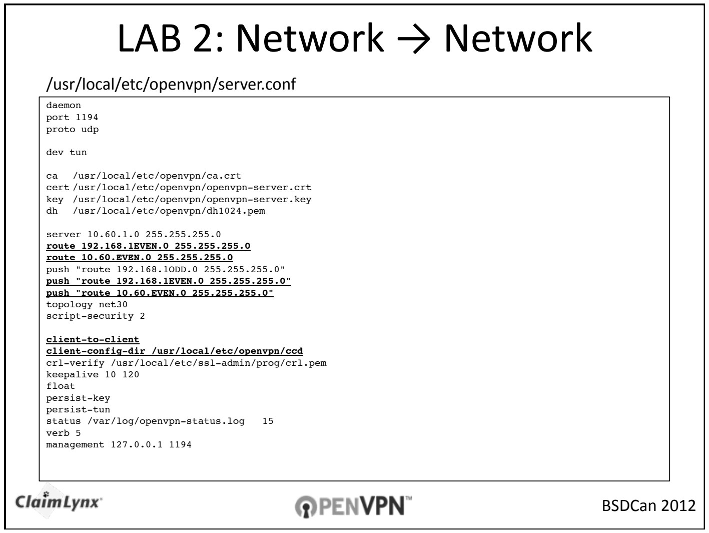

LAB 2: Network → Network

/usr/local/etc/openvpn/server.conf

```
daemon
port 1194
proto udp

dev tun

ca   /usr/local/etc/openvpn/ca.crt
cert /usr/local/etc/openvpn/openvpn-server.crt
key  /usr/local/etc/openvpn/openvpn-server.key
dh   /usr/local/etc/openvpn/dh1024.pem

server 10.60.1.0 255.255.255.0
route 192.168.1EVEN.0 255.255.255.0
route 10.60.EVEN.0 255.255.255.0
push "route 192.168.1ODD.0 255.255.255.0"
push "route 192.168.1EVEN.0 255.255.255.0"
push "route 10.60.EVEN.0 255.255.255.0"
topology net30
script-security 2

client-to-client
client-config-dir /usr/local/etc/openvpn/ccd
crl-verify /usr/local/etc/ssl-admin/prog/crl.pem
keepalive 10 120
float
persist-key
persist-tun
status /var/log/openvpn-status.log   15
verb 5
management 127.0.0.1 1194
```

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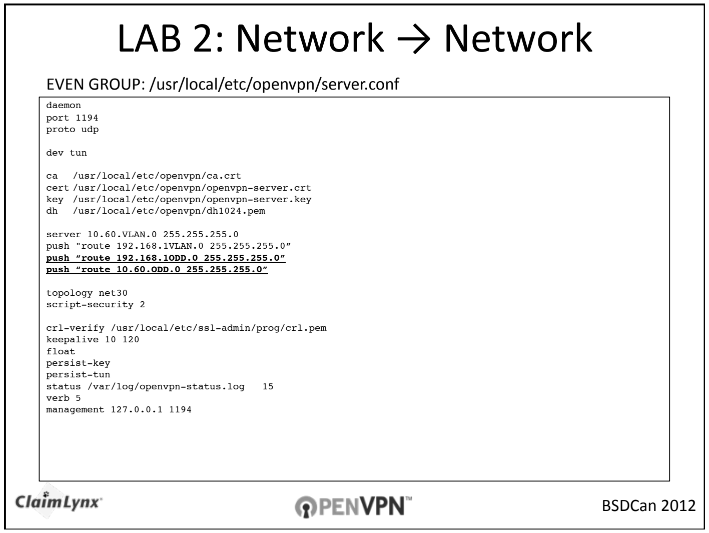

LAB 2: Network → Network

EVEN GROUP: /usr/local/etc/openvpn/server.conf

```
daemon
port 1194
proto udp

dev tun

ca   /usr/local/etc/openvpn/ca.crt
cert /usr/local/etc/openvpn/openvpn-server.crt
key  /usr/local/etc/openvpn/openvpn-server.key
dh   /usr/local/etc/openvpn/dh1024.pem

server 10.60.VLAN.0 255.255.255.0
push "route 192.168.1VLAN.0 255.255.255.0”
push “route 192.168.1ODD.0 255.255.255.0”
push “route 10.60.ODD.0 255.255.255.0”

topology net30
script-security 2

crl-verify /usr/local/etc/ssl-admin/prog/crl.pem
keepalive 10 120
float
persist-key
persist-tun
status /var/log/openvpn-status.log   15
verb 5
management 127.0.0.1 1194
```

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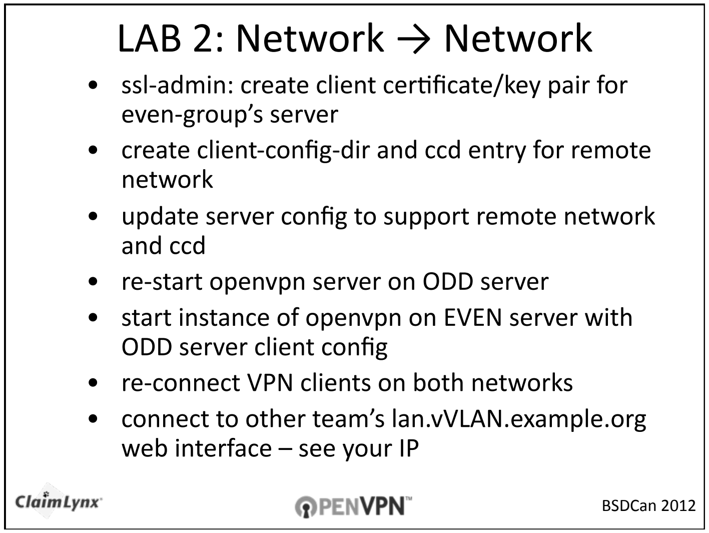

LAB 2: Network → Network

- ssl-admin: create client certificate/key pair for even-group’s server
- create client-config-dir and ccd entry for remote network
- update server config to support remote network and ccd
- re-start openvpn server on ODD server
- start instance of openvpn on EVEN server with ODD server client config
- re-connect VPN clients on both networks
- connect to other team’s lan.vVLAN.example.org web interface – see your IP

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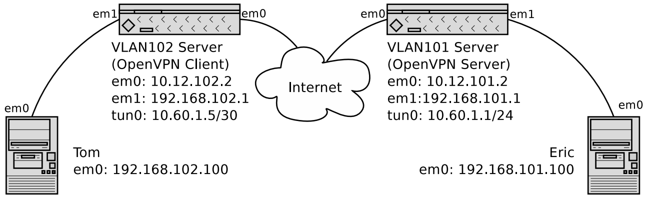
LAB 2: Network → Network

QUESTIONS?



LAB 3: PAM Authentication

- configure OpenVPN server to require username/password
- configure OpenVPN client to prompt user for username/password
- enable-password-save / --auth-user-pass
  - bug in configure scripts for this option – fix in the pipe
- --username-as-common-name
  - use passed username instead of certificate CN
- --client-cert-not-required
  - still encrypted!
  - operates like HTTPS, user/password important!

LAB 3: PAM Authentication

ODD EXAMPLE /usr/local/etc/openvpn/server.conf

```
daemon
port 1194
proto udp

dev tun

ca   /usr/local/etc/openvpn/ca.crt
cert /usr/local/etc/openvpn/openvpn-server.crt
key  /usr/local/etc/openvpn/openvpn-server.key
dh   /usr/local/etc/openvpn/dh1024.pem

server 10.60.1.0 255.255.255.0
route 192.168.1EVEN.0 255.255.255.0
route 10.60.EVEN.0 255.255.255.0
push "route 192.168.1ODD.0 255.255.255.0"
push "route 192.168.1EVEN.0 255.255.255.0"
push "route 10.60.EVEN.0 255.255.255.0"
topology net30
script-security 2

client-to-client
client-config-dir /usr/local/etc/openvpn/ccd
crl-verify /usr/local/etc/ssl-admin/prog/crl.pem
keepalive 10 120
float
persist-key
persist-tun
status /var/log/openvpn-status.log   15
verb 5
management 127.0.0.1 1194
plugin /usr/local/lib/openvpn-auth-pam.so "login login USERNAME password PASSWORD"
```

LAB 3: PAM Authentication

EVEN EXAMPLE /usr/local/etc/openvpn/server.conf

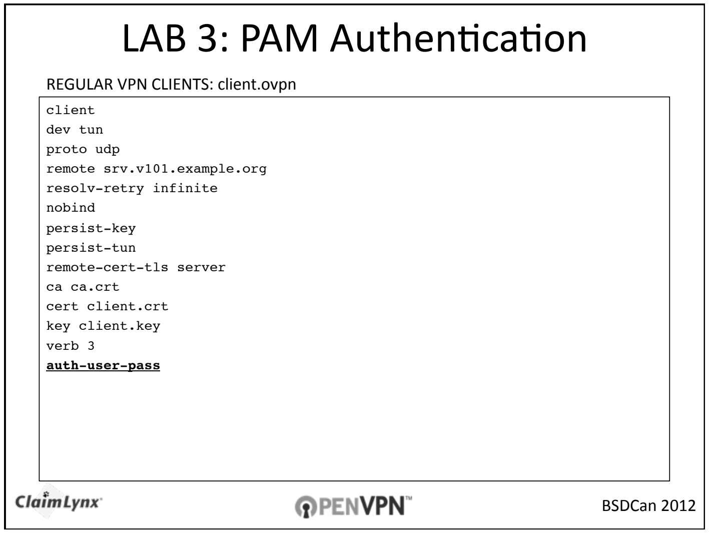
```
daemon
port 1194
proto udp

dev tun

ca   /usr/local/etc/openvpn/ca.crt
cert /usr/local/etc/openvpn/openvpn-server.crt
key  /usr/local/etc/openvpn/openvpn-server.key
dh   /usr/local/etc/openvpn/dh1024.pem

server 10.60.1.0 255.255.255.0
push "route 192.168.1EVEN.0 255.255.255.0"
push "route 192.168.1ODD.0 255.255.255.0"
push "route 10.60.ODD.0 255.255.255.0"
topology net30
script-security 2

client-to-client
client-config-dir /usr/local/etc/openvpn/ccd
crl-verify /usr/local/etc/ssl-admin/prog/crl.pem
keepalive 10 120
float
persist-key
persist-tun
status /var/log/openvpn-status.log   15
verb 5
management 127.0.0.1 1194
plugin /usr/local/lib/openvpn-auth-pam.so "login login USERNAME password PASSWORD”
```



LAB 3: PAM Authentication

REGULAR VPN CLIENTS: client.ovpn

```
client
dev tun
proto udp
remote srv.v101.example.org
resolv-retry infinite
nobind
persist-key
persist-tun
remote-cert-tls server
ca ca.crt
cert client.crt
key client.key
verb 3
auth-user-pass
```

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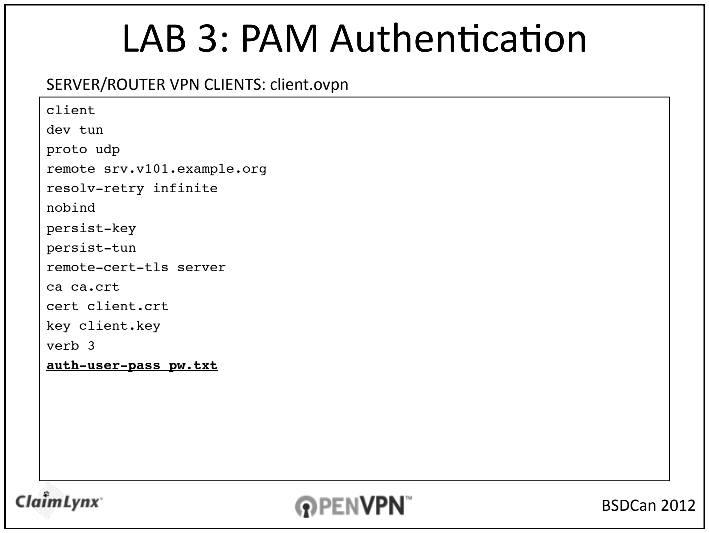

LAB 3: PAM Authentication

SERVER/ROUTER VPN CLIENTS: client.ovpn

```
client
dev tun
proto udp
remote srv.v101.example.org
resolv-retry infinite
nobind
persist-key
persist-tun
remote-cert-tls server
ca ca.crt
cert client.crt
key client.key
verb 3
auth-user-pass pw.txt
```

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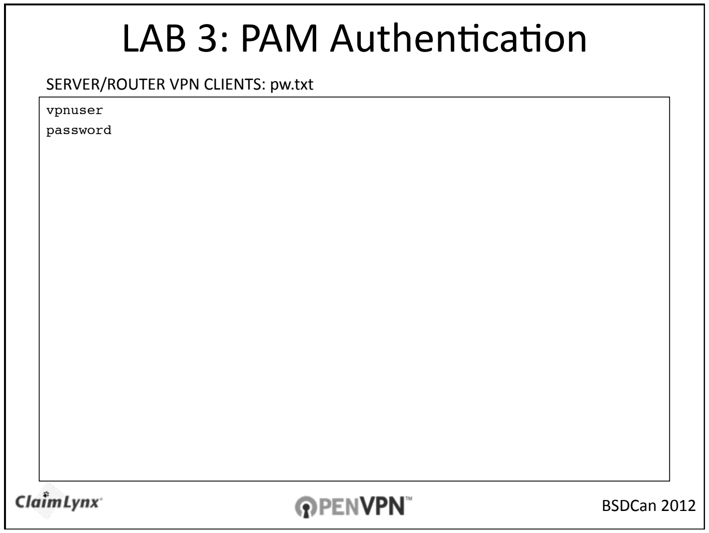

LAB 3: PAM Authentication

SERVER/ROUTER VPN CLIENTS: pw.txt

```
vpnuser
password
```

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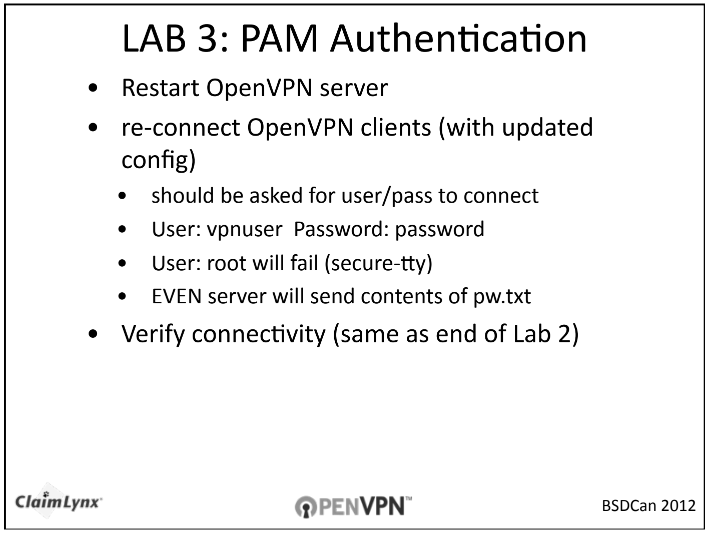

LAB 3: PAM Authentication

- Restart OpenVPN server
- re-connect OpenVPN clients (with updated config)
  - should be asked for user/pass to connect
  - User: vpnuser Password: password
  - User: root will fail (secure-tty)
  - EVEN server will send contents of pw.txt
- Verify connectivity (same as end of Lab 2)

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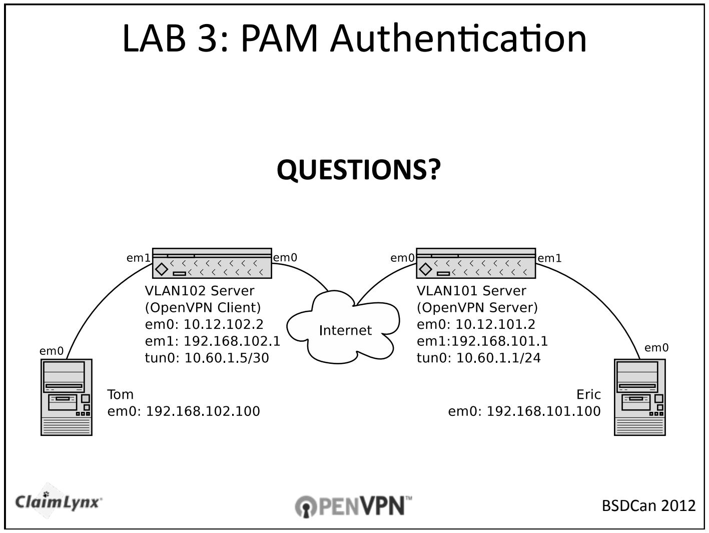
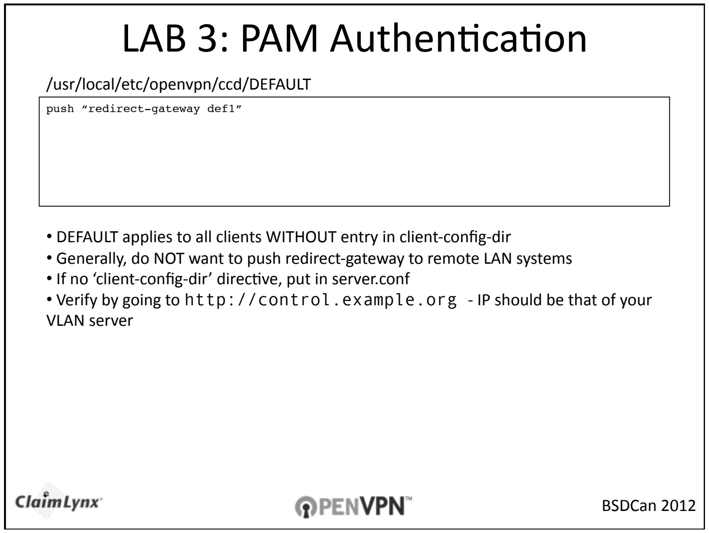


LAB 3: PAM Authentication

QUESTIONS?

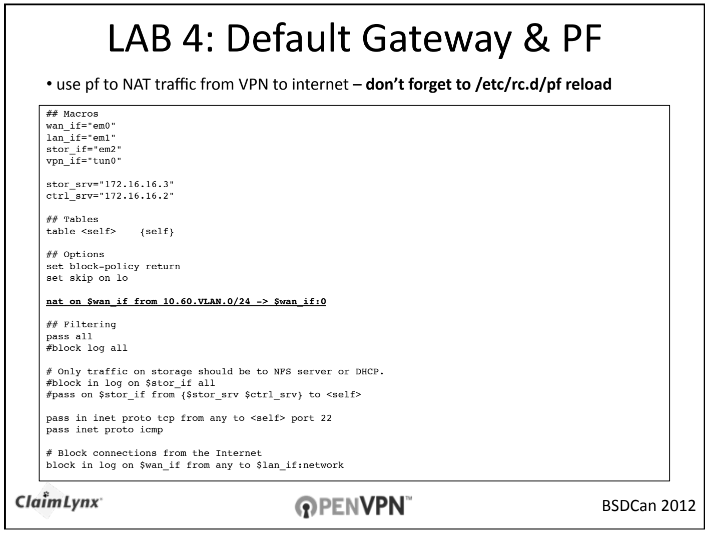


LAB 3: PAM Authentication

/usr/local/etc/openvpn/ccd/DEFAULT

```
push “redirect-gateway def1”
```

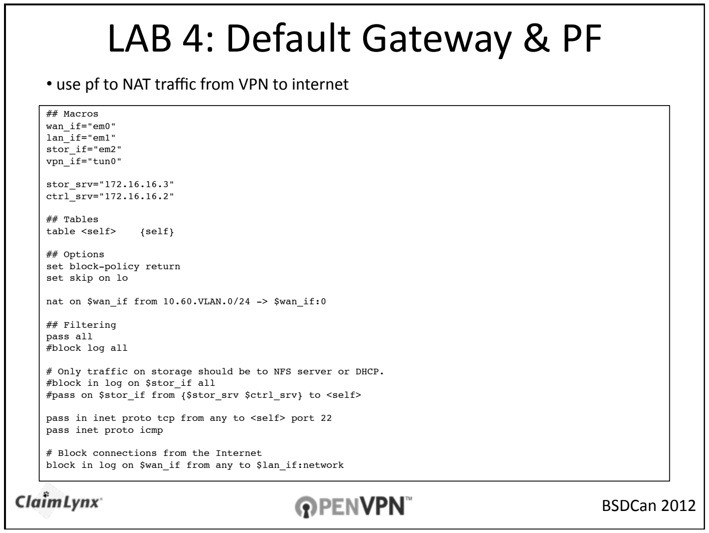
- DEFAULT applies to all clients WITHOUT entry in client-config-dir
- Generally, do NOT want to push redirect-gateway to remote LAN systems
- If no ‘client-config-dir’ directive, put in server.conf
- Verify by going to `http://control.example.org` - IP should be that of your VLAN server



LAB 4: Default Gateway & PF

- use pf to NAT traffic from VPN to internet – **don’t forget to /etc/rc.d/pf reload**

```
## Macros
wan_if="em0"
lan_if="em1"
stor_if="em2"
vpn_if="tun0"

stor_srv="172.16.16.3"
ctrl_srv="172.16.16.2"

## Tables
table <self>    {self}

## Options
set block-policy return
set skip on lo

nat on $wan_if from 10.60.VLAN.0/24 -> $wan_if:0

## Filtering
pass all
#block log all

# Only traffic on storage should be to NFS server or DHCP.
#block in log on $stor_if all
#pass on $stor_if from {$stor_srv $ctrl_srv} to <self>

pass in inet proto tcp from any to <self> port 22
pass inet proto icmp

# Block connections from the Internet
block in log on $wan_if from any to $lan_if:network
```



LAB 4: Default Gateway & PF

- use pf to NAT traffic from VPN to internet

```
## Macros
wan_if="em0"
lan_if="em1"
stor_if="em2"
vpn_if="tun0"

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table <self>    {self}

## Options
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set skip on lo

nat on $wan_if from 10.60.VLAN.0/24 -> $wan_if:0

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pass all
#block log all

# Only traffic on storage should be to NFS server or DHCP.
#block in log on $stor_if all
#pass on $stor_if from {$stor_srv $ctrl_srv} to <self>

pass in inet proto tcp from any to <self> port 22
pass inet proto icmp

# Block connections from the Internet
block in log on $wan_if from any to $lan_if:network
```

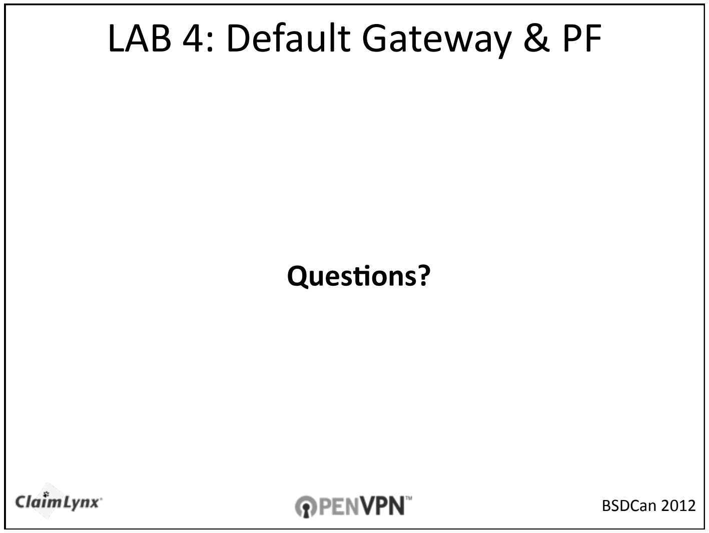

LAB 4: Default Gateway & PF

Questions?

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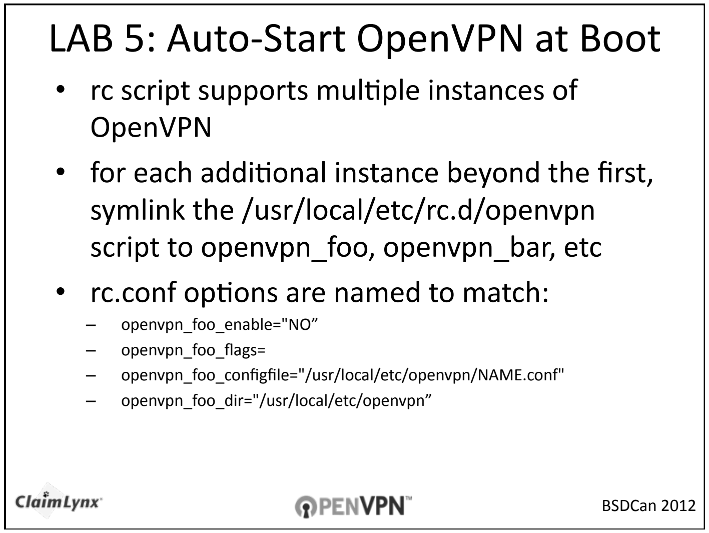

LAB 5: Auto-Start OpenVPN at Boot

- rc script supports multiple instances of OpenVPN
- for each additional instance beyond the first, symlink the /usr/local/etc/rc.d/openvpn script to openvpn_foo, openvpn_bar, etc
- rc.conf options are named to match:
  - openvpn_foo_enable="NO"
  - openvpn_foo_flags=
  - openvpn_foo_configfile="/usr/local/etc/openvpn/NAME.conf"
  - openvpn_foo_dir="/usr/local/etc/openvpn"

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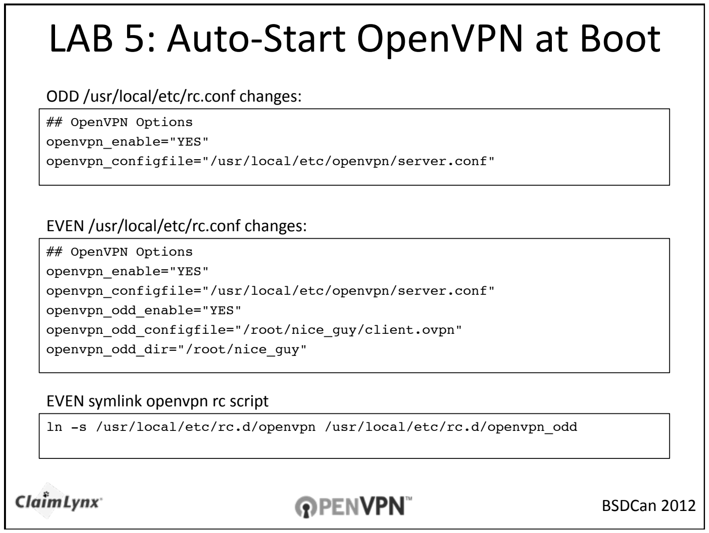

LAB 5: Auto-Start OpenVPN at Boot

ODD /usr/local/etc/rc.conf changes:

```
## OpenVPN Options
openvpn_enable="YES"
openvpn_configfile="/usr/local/etc/openvpn/server.conf"
```

EVEN /usr/local/etc/rc.conf changes:

```
## OpenVPN Options
openvpn_enable="YES"
openvpn_configfile="/usr/local/etc/openvpn/server.conf"
openvpn_odd_enable="YES"
openvpn_odd_configfile="/root/nice_guy/client.ovpn"
openvpn_odd_dir="/root/nice_guy"
```

EVEN symlink openvpn rc script

```
ln -s /usr/local/etc/rc.d/openvpn /usr/local/etc/rc.d/openvpn_odd
```

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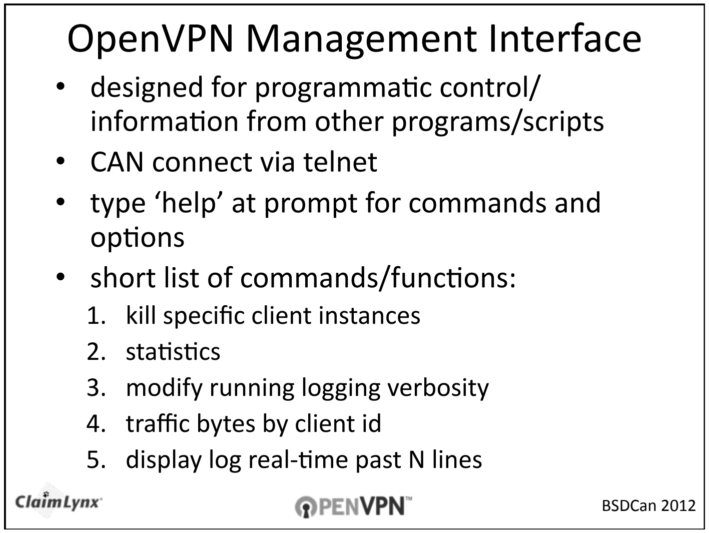

OpenVPN Management Interface

- designed for programmatic control/ information from other programs/scripts
- CAN connect via telnet
- type 'help' at prompt for commands and options
- short list of commands/functions:
  1. kill specific client instances
  2. statistics
  3. modify running logging verbosity
  4. traffic bytes by client id
  5. display log real-time past N lines

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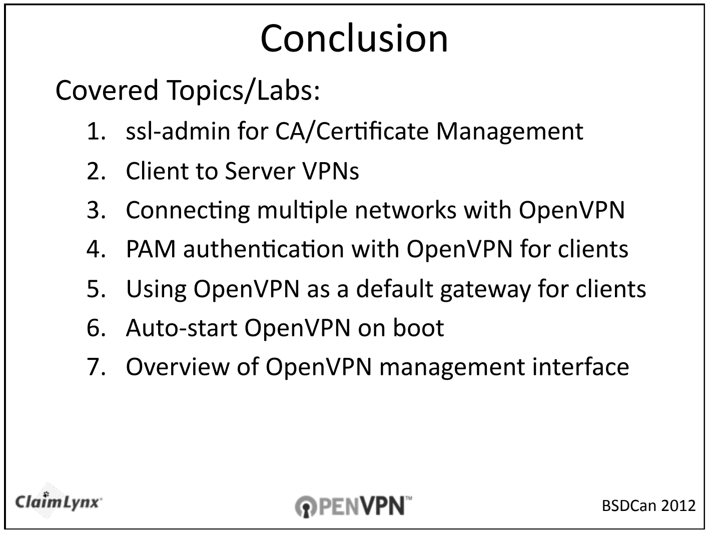

Conclusion

Covered Topics/Labs:

1. ssl-admin for CA/Certificate Management
2. Client to Server VPNs
3. Connecting multiple networks with OpenVPN
4. PAM authentication with OpenVPN for clients
5. Using OpenVPN as a default gateway for clients
6. Auto-start OpenVPN on boot
7. Overview of OpenVPN management interface

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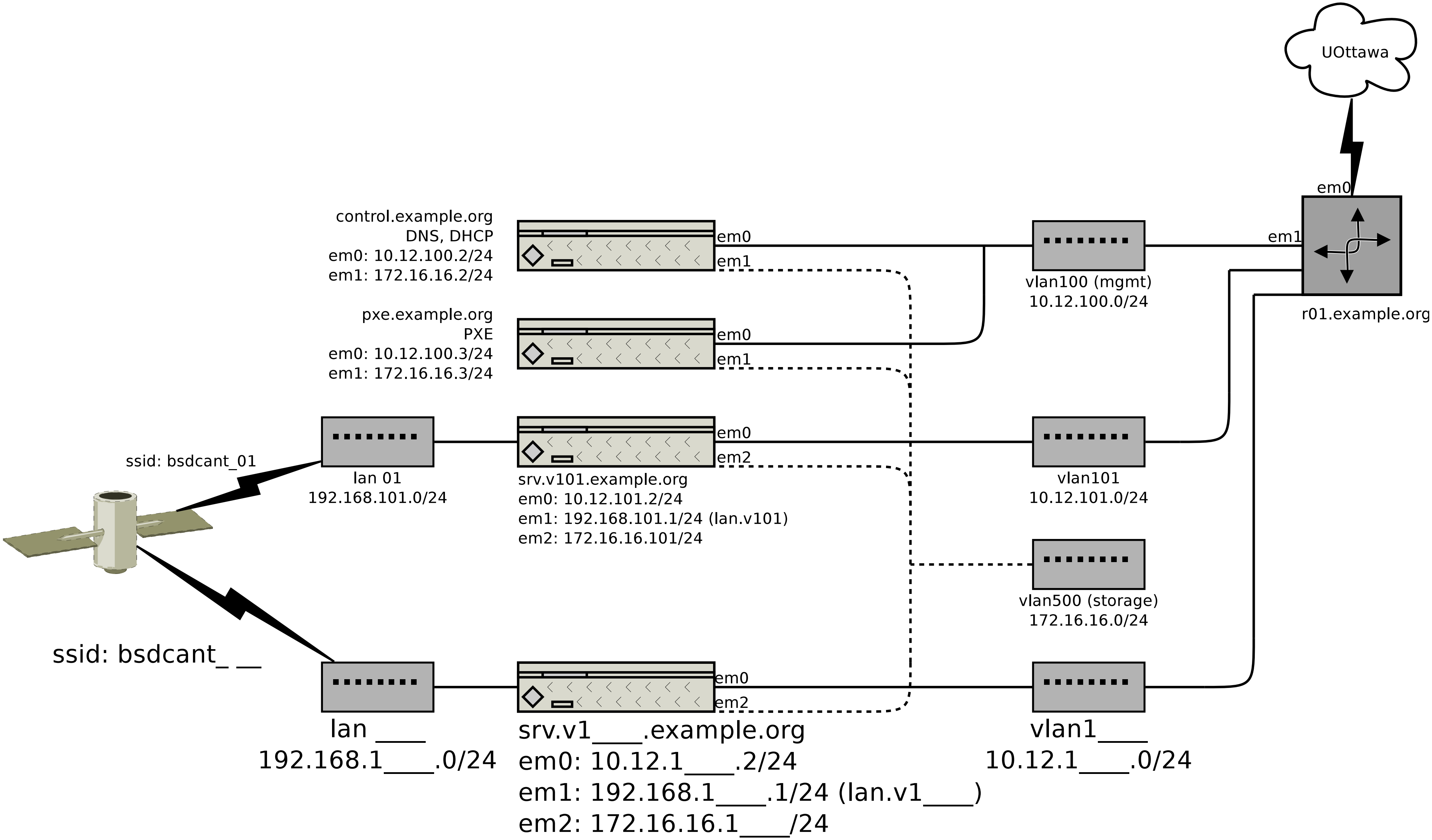
Worksheet 1



UOttawa

em0

em1

r01.example.org

control.example.org
DNS, DHCP
em0: 10.12.100.2/24
em1: 172.16.16.2/24

em0

em1

vlan100 (mgmt)
10.12.100.0/24

pxe.example.org
PXE
em0: 10.12.100.3/24
em1: 172.16.16.3/24

em0

em1

ssid: bsdcant_01

lan 01
192.168.101.0/24

em0

em2

srv.v101.example.org
em0: 10.12.101.2/24
em1: 192.168.101.1/24 (lan.v101)
em2: 172.16.16.101/24

vlan101
10.12.101.0/24

vlan500 (storage)
172.16.16.0/24

ssid: bsdcant_ __

em0

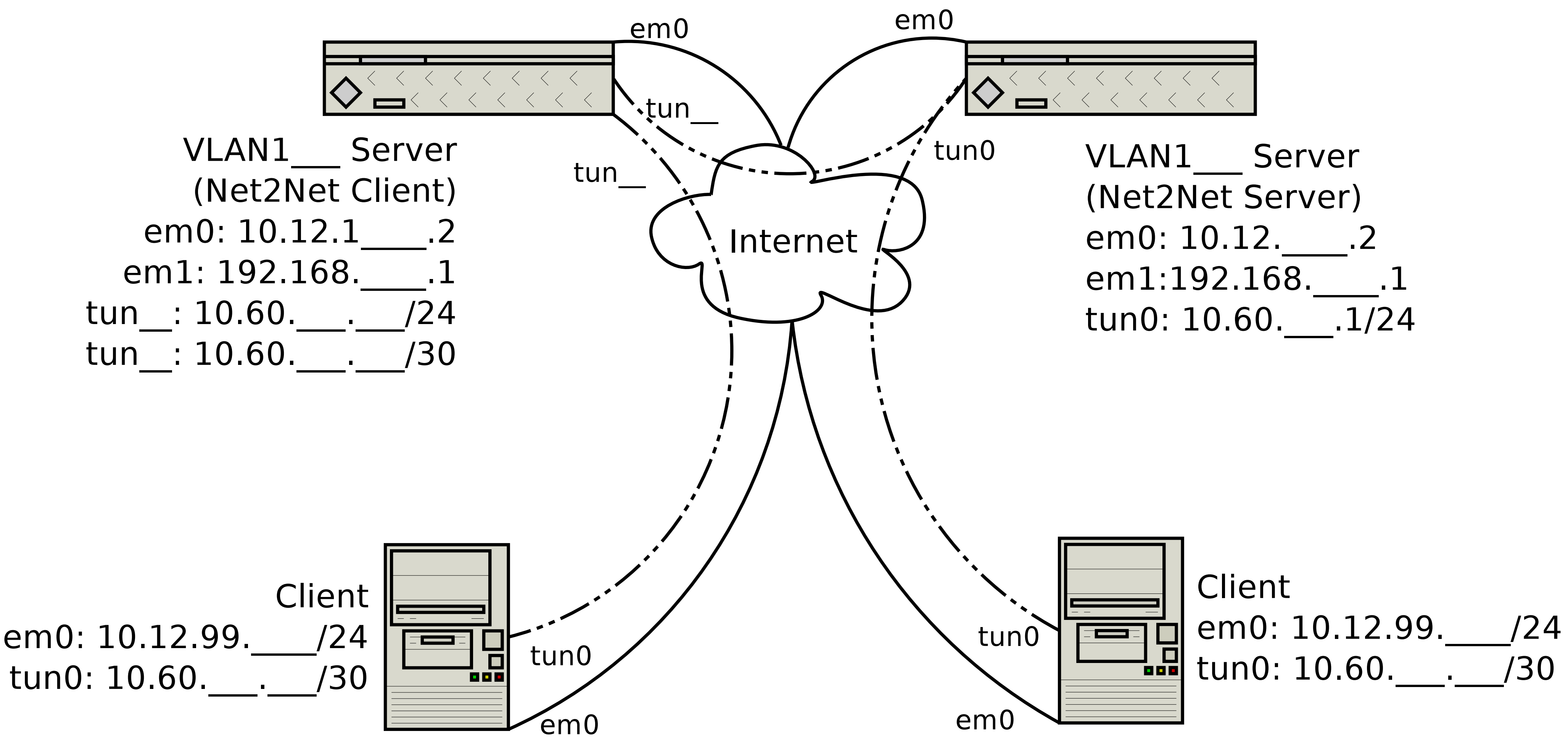
em2

lan ____
192.168.1____.0/24

srv.v1____.example.org
em0: 10.12.1____.2/24
em1: 192.168.1____.1/24 (lan.v1____)
em2: 172.16.16.1____/24

vlan1____
10.12.1____.0/24

Worksheet 2



VLAN1___ Server
(Net2Net Client)
em0: 10.12.1____.2
em1: 192.168.____.1
tun__: 10.60.___.___/24
tun__: 10.60.___.___/30

VLAN1___ Server
(Net2Net Server)
em0: 10.12.____.2
em1:192.168.____.1
tun0: 10.60.___.1/24

Client
em0: 10.12.99.____/24
tun0: 10.60.___.___/30

Client
em0: 10.12.99.____/24
tun0: 10.60.___.___/30