– General Linux 2 –

[]

(Linux Professional Institute Certification)

a


```
   .~.
   /V\      by: geoffrey robertson
  // \\         geoffrey@zip.com.au
  @._.@
```



```
$Id: gl2.113.5.slides.tex,v 1.1 2003/11/05 09:03:09 geoffr Exp $
```

List of Slides

Shells, Scripting, Programming & Compiling

2.113.1 Configure and manage inetd, xinetd, and related services

2.113.2 Operate and perform basic configuration of sendmail

2.113.3 Operate and perform basic configuration of Apache

2.113.4 Properly manage the NFS, smb, and nmb daemons

2.113.5 **Setup and configure basic DNS services []**

2.113.7 Set up secure shell (OpenSSH)

Setup and Configure basic DNS services

Objective

Candidate should be able to configure hostname lookups and troubleshoot problems with local caching-only name server. Requires an understanding of the domain registration and DNS translation process. Requires understanding key differences in configuration files for bind 4 and bind 8.

Setup and Configure basic DNS services

Key files, terms, and utilities

```
/etc/hosts
/etc/resolv.conf
/etc/nsswitch.conf
/etc/named.boot (v.4) or /etc/named.conf (v.8)
named
```

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  - Third & lower level domains are handled by the domain owner.

DNS - DOMAIN NAME SERVICE

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- Example:

```
node1.office.my-domain.com
^     ^      ^       ^
|     |      |       |
|     |      |       -- Top level domain
|     |      -- Second level domain
|     - Subdomain
-- Hostname
```

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```

- Domain names are fully qualified (FQDN) when a name is specified all the way down to the hostname.

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    - Read `resolv.conf` to see what nameserver to use
    - Send request to nameserver and wait for response
  - `nsswitch` says USE HOSTS
    - Lookup /etc/hosts for a matching hostname

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  shadow: files nisplus nis

  group: files nisplus nis

  hosts: db files dns

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  passwd: files nisplus nis

  shadow: files nisplus nis

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- Note that the other entries like passwd, shadow and group are used for other applications like login and have nothing to do with DNS.

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- In the hosts line, we see that any hostname to be looked up will be done in the following order:
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  2. Read /etc/hosts
  3. Search DNS

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  1. Use local databases file (.db files in /var/db)
  2. Read /etc/hosts
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- The Search options can be one of:

```
nisplus (or nis+) - Consult NIS+ (Yellow Pages)
nis (or yp)       - Consult NIS
dns               - Use a DNS server
files             - Use local files like /etc/hosts
db                - Use local database files
compat            - Use NIS in compat mode
```

```
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An example `nsswitch` file:

```
nisplus (or nis
passwd:     db files nisplus nis
shadow:     nisplus
group       db files nisplus nis

hosts:      db files nis dns

# Example - obey only what nisplus tells us...
#services:   nisplus [NOTFOUND=return] files
#networks:   nisplus [NOTFOUND=return] files
#protocols:  nisplus [NOTFOUND=return] files
#rpc:        nisplus [NOTFOUND=return] files
#ethers:     nisplus [NOTFOUND=return] files
#netmasks:   nisplus [NOTFOUND=return] files

bootparams: nisplus [NOTFOUND=return] files

ethers:     files
netmasks:   files
networks:   files nis
```

```
protocols:  files nisplus
rpc:        files
services:   files nisplus

netgroup:   files nisplus

publickey:  nisplus

automount:  files nisplus
aliases:    files nisplus
```

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search aes
nameserver 10.27.1.10
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- The 'search' line says what to append to a non-fully qualified name: eg: ping node10 –¿ ping node10.aes
- The nameserver lines tell the hostname routines which dns server to send requests to. (If first lookup fails, use the second, third etc)

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- Bind is just one implementation of a DNS. Bind is to DNS what Apache is to http.
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/etc/named.conf    - For BIND V8
/etc/named.boot    - For BIND V4
```

- Know that there is a difference between V4 & V8.
- Know how to configure V8 but not V4. (Different syntax)

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  - Remote Servers → Characteristics of remote servers
  - zones → Information about our defined domains

An Example Config file:

```
options {
        directory "/var/named/";
        forward only;
        forwarders {
            203.2.75.132;
            203.2.75.108;
        };
        query-source address * port 53;
        listen-on {
            10.27.1.10;
            127.0.0.1;
        };
        notify no;
};

#### The root zone ###
zone  "." {
        type hint;
        file  "named.ca";
};
```

```
#### A zone for localhost ###
zone  "0.0.127.in-addr.arpa" {
        type master;
        file  "0.0.127.in-addr.arpa.zone";
};

zone  "localhost" {
        type master;
        file  "localhost.zone";
};

### A local domain ###
zone  "1.27.10.in-addr.arpa" {
        type master;
        file  "1.27.10.in-addr.arpa.zone";
};

zone  "aes" {
        type master;
        file  "aes.zone";
};
```

```
key "key" {
        algorithm hmac-md5;
        secret "JoqlFqtncqurkhMOrrbQLYRcxSYXoNROvNTZBqWJFumleNkzOvEvTAbqpbMV";
};
```

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  - Forward file –¿ ¡domain¿.zone
  - Reverse file –¿ ¡Net-IP¿.in-addr.arpa
- Where the Net-IP is the network part of the IP address.

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LOC record Defines the physical location of the server

SRV record Defines what services are found where (eg ftp, http etc)

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LOC record Defines the physical location of the server

SRV record Defines what services are found where (eg ftp, http etc)

A record Defines hostname to IP address translations (forward file)

PTR record Defines IP address to hostname translations (reverse file)

Example Forward file `/var/named/aes.zone`

```
@       IN      SOA     node10.aes.  root.localhost (
                        2 ; serial
                        28800 ; refresh
                        7200 ; retry
                        604800 ; expire
                        86400 ; ttl
                        )

@       IN      NS      node10.aes.

node5   IN      MX      10      mail
node6   IN      MX      10      mail
node4   IN      MX      10      mail
node2   IN      MX      10      mail
node10  IN      MX      10      mail
gw      IN      MX      10      mail

node10  IN      A       10.27.1.10
node2   IN      A       10.27.1.2
node4   IN      A       10.27.1.4
```

```
node5   IN      A       10.27.1.5
node6   IN      A       10.27.1.6
cds     IN      A       10.27.1.99
gw      IN      A       10.27.1.254

ns      IN      CNAME   node10
mail    IN      CNAME   node10
node-4  IN      CNAME   node4
```

Example reverse file `/var/named/1.27.10.in-ad`

```
@       IN      SOA     @       root.localhost (
                        2 ; serial
                        28800 ; refresh
                        7200 ; retry
                        604800 ; expire
                        86400 ; ttk
                        )


@       IN      NS      ns.aes.

2       IN      PTR     node2.aes.
4       IN      PTR     node4.aes.
5       IN      PTR     node5.aes.
6       IN      PTR     node6.aes.
10      IN      PTR     node10.aes.
99      IN      PTR     cds.aes.
254     IN      PTR     gw.aes.
```

Configuring a Caching only Nameserver

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  The first time a name is needed, a normal lookup occurs (Authorative)
  The next time that name is needed, it is returned from cache
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  The first time a name is needed, a normal lookup occurs (Authorative)
  The next time that name is needed, it is returned from cache
  (Non-authorative)
- Under /etc/named.conf in the options section, just make sure you have the following directives set:

```
options {
        directory "/var/named/";
        forward only;
        forwarders {
            <First DNS to query>;
            <Second DNS to query>;
        };
```

```
listen-on {                <Your local IP address>;
    127.0.0.1;
};
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- Leave the root zone (.) and localhost entries as they are.

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  - dig
  - host
- To use in their simplest form, just add the hostname you wish to query as the first option to the command:

```
nslookup node16.c222
dig node16.c222
host node16.c222
```

nslookup

nslookup

- Usage: `nslookup [option] host-to-find [-name-server]`

  Example:

  ```
  $ nslookup node2.aes -10.27.1.10 ↩
  ```

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  Example:

  ```
  $ nslookup node2.aes -10.27.1.10 ↩
  ```

- Note: nslookup is deprecated and may be removed from future releases. Consider using the 'dig' or 'host' programs instead. Run nslookup with the `-sil[ent]` option to prevent this message from appearing.

```
Server:         10.27.1.10
Address:        10.27.1.10#53

Name:   node2.aes
Address: 10.27.1.2
```


dig

dig

- Usage: `dig [@name-server] host-to-find [query-type]`

dig

- Usage: `dig [@name-server] host-to-find [query-type]`
- Example:

```
$ dig @10.27.1.10 node2.aes ↩

; <<>> DiG 9.2.0 <<>> @10.27.1.10 node2.aes
;; global options:  printcmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 43860
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 1, ADDITIONAL: 1

;; QUESTION SECTION:
;node2.aes.                     IN      A

;; ANSWER SECTION:
node2.aes.              86400   IN      A       10.27.1.2

;; AUTHORITY SECTION:
aes.                    86400   IN      NS      node10.aes.
```

```
;; ADDITIONAL SECTION:
node10.aes.             86400   IN      A       10.27.1.10

;; Query time: 5 msec
;; SERVER: 10.27.1.10#53(10.27.1.10)
;; WHEN: Mon Sep  2 13:48:38 2002
;; MSG SIZE  rcvd: 80
```

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host

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- Example:

```
$ host node2.aes ↩
node2.aes has address 10.27.1.2
```

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```
# rpm -Uvh bind-9*.rpm
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2. Configure a Caching only nameserver on your machine. (Make all queries forward to 192.168.222.254)

3. Make changes to resolv.conf & nsswitch.conf as required (Default domain to use is c222)

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4. Start the named.

   ```
   # service named start
   ```

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2. Configure a Caching only nameserver on your machine. (Make all queries forward to 192.168.222.254)

3. Make changes to resolv.conf & nsswitch.conf as required (Default domain to use is c222)

4. Start the named.

   ```
   # service named start
   ```

5. Test it out with the host node16.c222 using:

   - nslookup
   - dig

- host

- host

- host

- host

- host

- host

6. Test again this time with the host box16

- host

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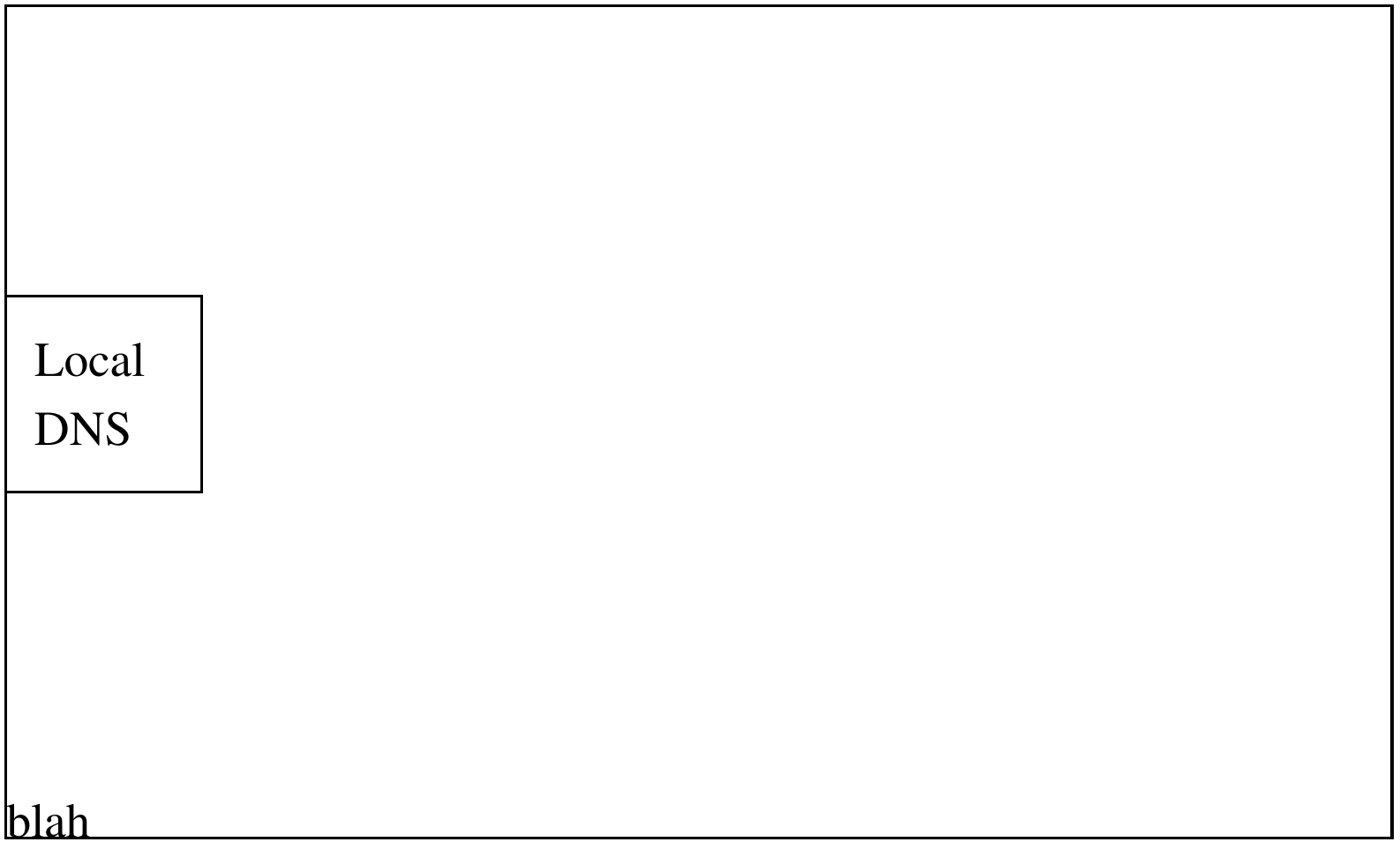
7. (For those who want a DNS challenge)
   (a) Setup a set of zones for the .c222 domain.
   (b) Insert the new zone into the main configuration file
   (c) Restart the named and test it.

DNS Name Lookup Procedure



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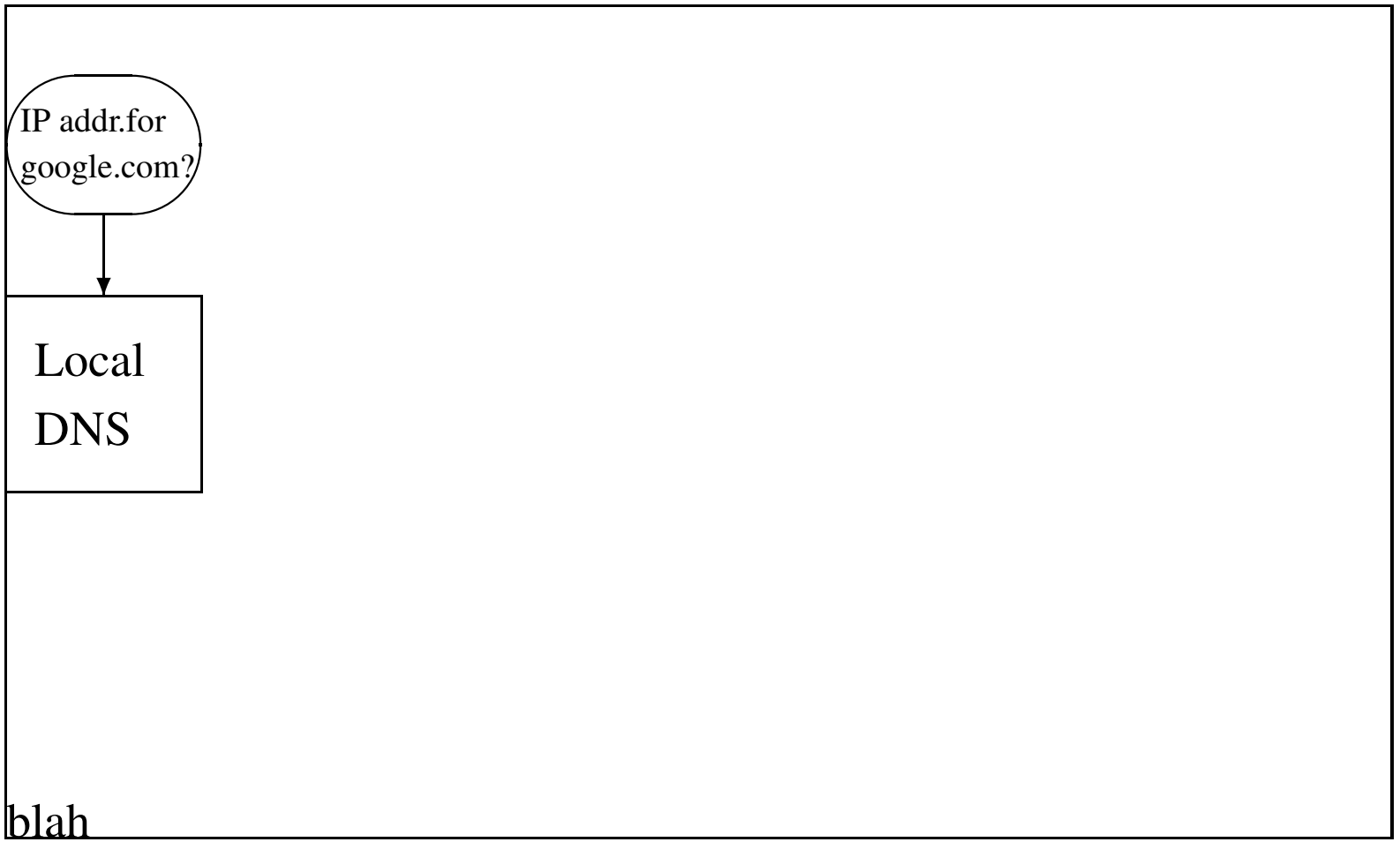

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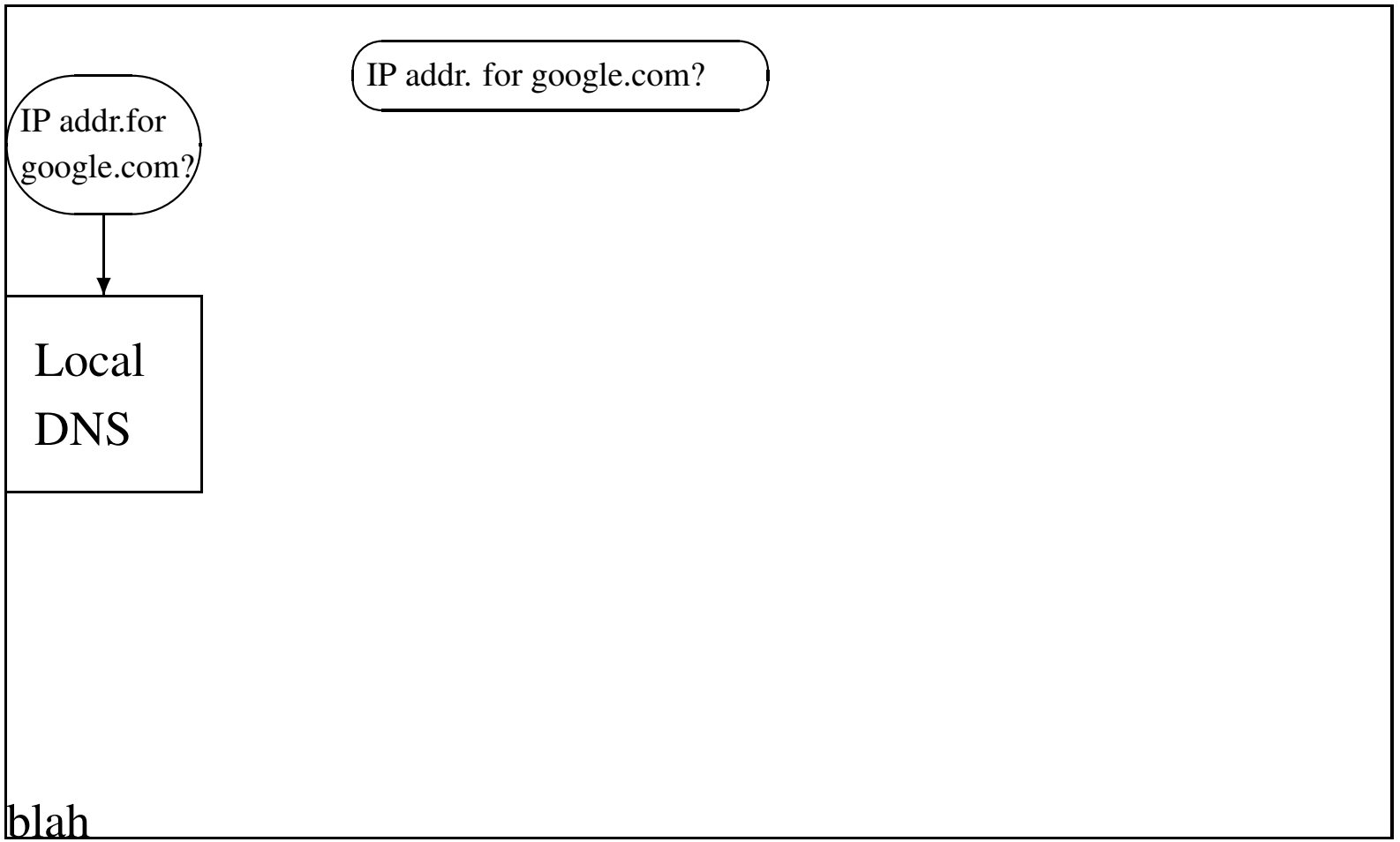
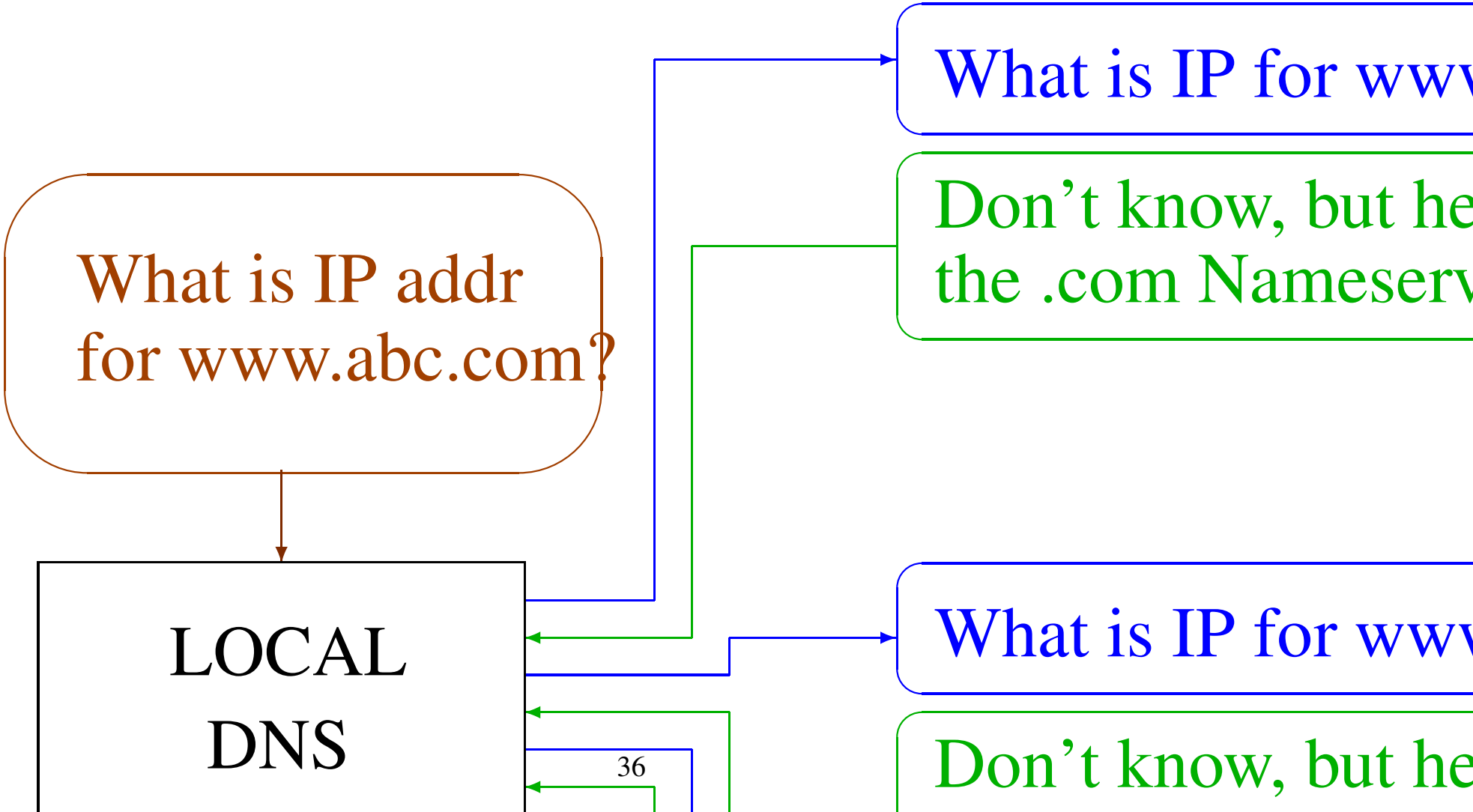
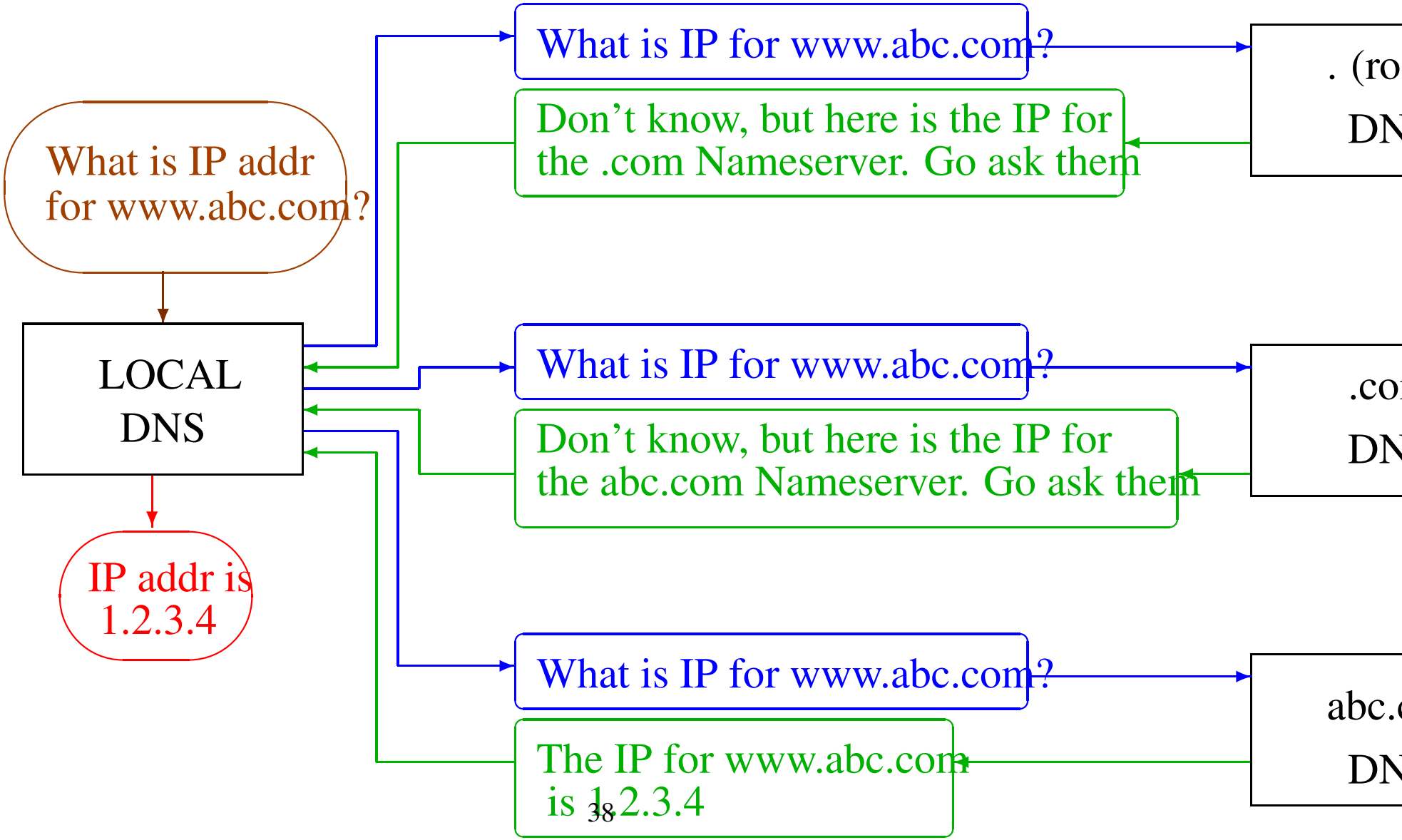


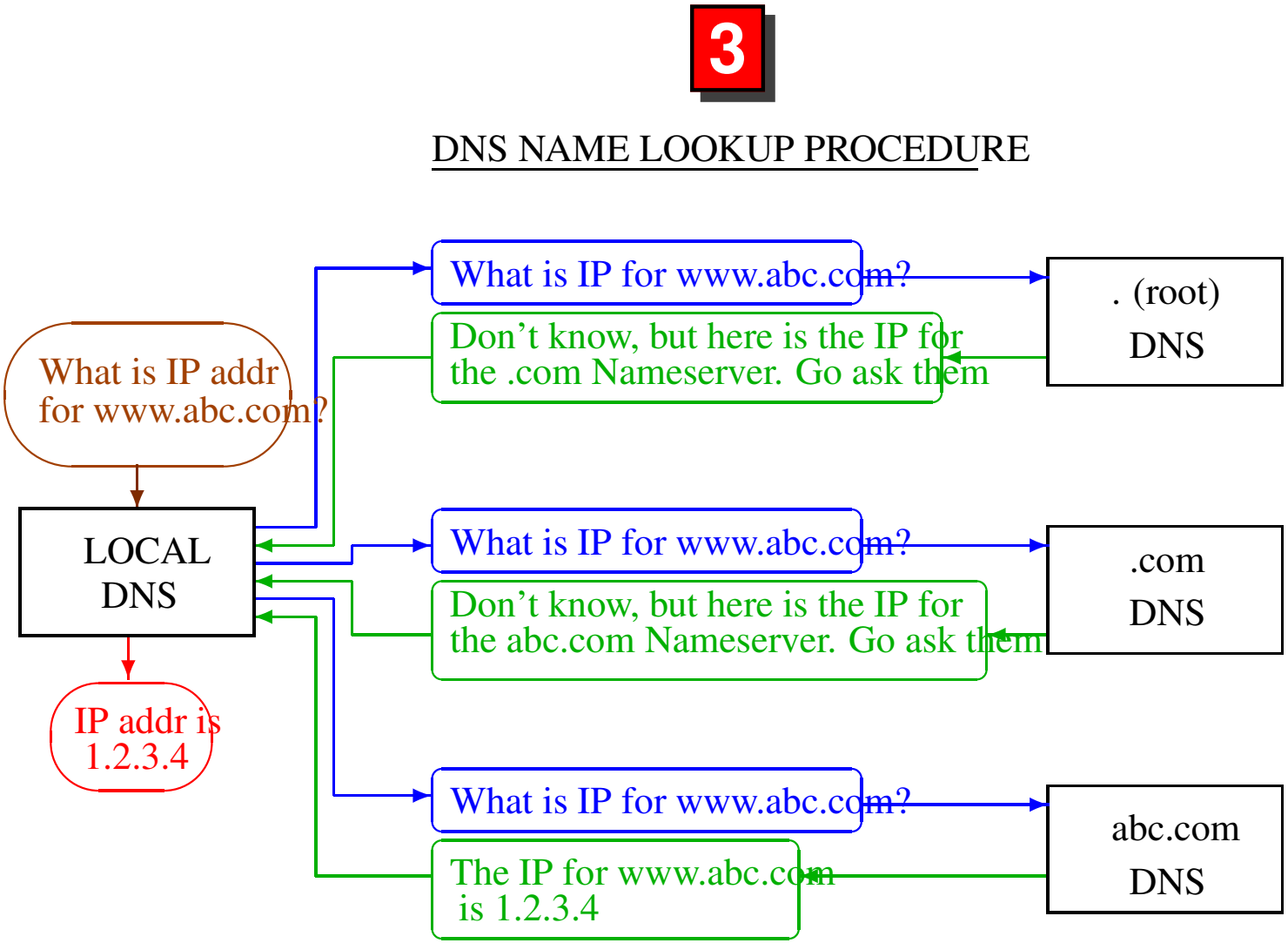
DNS NAME LO


What is IP addr
for www.abc.com?
LOCAL
DNS
What is IP for www
Don’t know, but he
the .com Nameserv
What is IP for www
Don’t know, but he


2

DNS NAME LOOKUP PROCEDURE




3
DNS NAME LOOKUP PROCEDURE
What is IP addr for www.abc.com?
LOCAL DNS
IP addr is 1.2.3.4
What is IP for www.abc.com?
Don't know, but here is the IP for the .com Nameserver. Go ask them
. (root) DNS
What is IP for www.abc.com?
Don't know, but here is the IP for the abc.com Nameserver. Go ask them
.com DNS
What is IP for www.abc.com?
The IP for www.abc.com is 1.2.3.4
abc.com DNS

The End