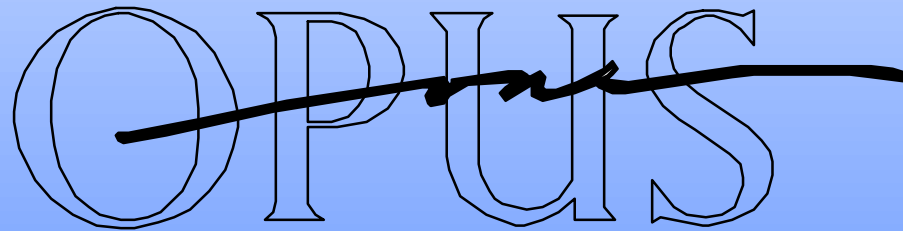


Domain Name Service Hints and Kinks for the Primary Domain Administrator

The word "OPUS" is rendered in a large, outlined, serif font. A thick, black, handwritten-style signature line is drawn across the letters, starting from the left side of the 'O' and extending past the 'S'.

Jan Trumbo

Trumbo@Opus1.COM

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You are here

```
primary          Arizona.EDU          MultiNet_DNS:arizona.hosts
primary          196.128.in-addr.arpa MultiNet_DNS:univ-ariz.rev
primary          0.0.127.in-addr.arpa MultiNet:Domain-Name-
Service.Local
primary          Tucson.ORG          MultiNet_DNS:Tucson-org.Hosts
primary          Tucson.AZ.US       MultiNet_DNS:Tucson.Hosts
primary          CID.ORG            MultiNet_DNS:CID.Hosts
primary          UMCAz.EDU         MultiNet_DNS:UMCAz.Hosts
primary          LOCALHOST         MultiNet_DNS:localhost.
;
; az.us domains taken over from westnet 9/20/96
;
primary          cc.az.us           MultiNet_DNS:cc_az_us.hosts
primary          chandler.az.us   MultiNet_DNS:chandler_az_us.hosts
primary          coconino.az.us  MultiNet_DNS:coconino_az_us.hosts
primary          sierra-vista.az.us MultiNet_DNS:sierra-
vista_az_us.hosts
primary          tec.az.us         MultiNet_DNS:tec_az_us.hosts
;
; in-addr.arpa domains taken over from westnet 9/24/96
;Slide 2
```

DNS Administration Roadmap

- ❖ Zone file organization
- ❖ Zone file Do's and Don'ts
- ❖ Appropriate use of RR's
- ❖ SOA parameters
- ❖ Admin netiquette
- ❖ Architectures

Zone File Organization

Use \$ORIGIN Throughout

Explicit \$ORIGIN at top of zone file
prevents stupid human errors

```
$ORIGIN Pima.EDU.
```

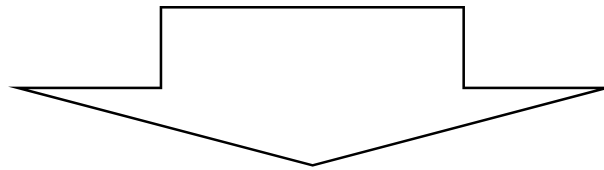
```
;  
@           in      soa      arizona.edu. system.pima.edu.  
(  
           921104   ; Serial  
           43200   ; Refresh -- 12 hours  
           21600   ; Retry -- 6 hours  
           3600000 ; Expire  
           86400  ) ; Minimum -- 24 hours  
           in      ns      arizona.edu.  
           in      ns      ccnucb.colorado.edu.
```

Short Cuts

- ❖ Zone files can use abbreviated records
 - ❖ Saves typing
 - ❖ Can make things clearer
- ❖ Trailing dot controls if domain name will be appended

Record Short Cuts

```
cone.tgv.com.  in a      161.44.128.73
cone.tgv.com.  in mx 10   hq.tgv.com.
cone.tgv.com.  in mx 20   fang.tgv.com.
```



```
$ORIGIN TGV.COM.
cone          in a      161.44.128.73
              in mx 10   hq
              in mx 20   fang
```

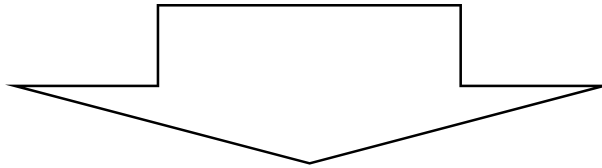
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Short Cuts

```
71.128.44.161.in-addr.arpa.  in ptr  hq.tgv.com.  
72.128.44.161.in-addr.arpa.  in ptr  fang.tgv.com.  
73.128.44.161.in-addr.arpa.  in ptr  tide.tgv.com.  
74.128.44.161.in-addr.arpa.  in ptr  wash.tgv.com.
```



```
$ORIGIN 128.44.161.in-addr.arpa.  
71      in ptr  hq.tgv.com.  
72      in ptr  fang.tgv.com.  
73      in ptr  tide.tgv.com.  
74      in ptr  wash.tgv.com.
```


Organize by Subdomain

```
$ORIGIN acms.Arizona.EDU.
```

```
@          in      ns      math.arizona.edu.
```

```
          in      ns      arizona.edu.
```

```
<stuff>
```

```
$ORIGIN acs.Arizona.EDU.
```

```
@          in      txt      "ACS - Agricultural Computer Support"
```

```
<stuff>
```

```
$ORIGIN ACT.Arizona.EDU.
```

```
@          in      txt      "ACT - Anthro group in Geronimo"
```

```
<stuff>
```

```
$ORIGIN YVF.Arizona.EDU.
```

```
@          in      txt      "Yuma Valley Farm - Colleg of Ag"
```

```
<stuff>
```

Within Subdomains, Organize Alphabetically

```
$ORIGIN YVF.Arizona.EDU.
```

```
@          in      txt      "Yuma Valley Farm - Colleg of Ag"  
          in      txt      "NetMgr: Bob Greenberg  
bgreen@ag.Arizona.EDU>"
```

```
Aggie      in      a       206.207.133.5  
Dottie    in      a       206.207.133.2  
Letty     in      a       206.207.133.7  
Marin     in      a       206.207.133.6  
Mosquito  in      a       206.207.133.4  
Piggy     in      a       206.207.133.3
```

Organize PTRs by Subnet

```
$ORIGIN 1.196.128.IN-ADDR.ARPA.  
0      in      txt      "UNIV-ARIZ-MAIN subnet"  
<stuff>  
$ORIGIN 3.196.128.IN-ADDR.ARPA. ; DHCP-TEST-NET  
@      in      txt      "DHCP Test address range"  
<stuff>  
$ORIGIN 4.196.128.IN-ADDR.ARPA.  
@      in      ns      sneeze.resp-sci.Arizona.EDU.  
      in      ns      resp-sci.Arizona.EDU.  
      in      ns      Arizona.EDU.  
      in      ns      rip.psg.com.  
<etc etc etc>
```

Within Subnets, Organize By Number

```
$ORIGIN 6.196.128.IN-ADDR.ARPA.
```

```
1      in      ptr      RINGO-FCR.Telcom.Arizona.EDU.  
2      in      ptr      blbarber.FCR.Arizona.EDU.  
3      in      ptr      mburke.FCR.Arizona.EDU.  
5      in      ptr      marczak.fcr.Arizona.EDU.  
11     in      ptr      nico.fcr.Arizona.EDU.  
12     in      ptr      cona.fcr.Arizona.EDU.  
13     in      ptr      conb.fcr.Arizona.EDU.  
14     in      ptr      latin.fcr.Arizona.EDU.  
73     in      ptr      rcate.FCR.Arizona.EDU.  
75     in      ptr      mmiller.FCR.Arizona.EDU.  
77     in      ptr      galbrai.FCR.Arizona.EDU.
```

Annotate Your Subdomains

```
$ORIGIN ACT.Arizona.EDU.
```

```
@      in      txt      "ACT - Anthro group in Geronimo"  
      in      txt      "NetMgr: William Jolley  
<wjolley@CCIT.Arizona.EDU>"
```

```
inplan1      in      a          128.196.172.123  
              in      hinfo     "Everex 386is" "DOS"  
              in      txt       "Carla Nunn Admin 412C"
```

```
101-13a-3ch1 in      a          150.135.13.58  
              in      hinfo     "24 port 3com/bridge" "SNMP"  
              in      txt       "Location: animal care rm.13a bet"
```

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Annotate Your Networks

```
$ORIGIN 6.196.128.IN-ADDR.ARPA.
```

```
;FCR
```

```
0      in      txt      "FCR (Home Ec) subnet"  
      in      txt      "NetMgr: Mary Miller <MAMILLER@CCIT.Arizona.EDU>  
      in      ptr      FCR.Arizona.EDU.  
      in      a       255.255.255.0
```

```
$ORIGIN 9.135.150.IN-ADDR.ARPA.
```

```
0      IN       TXT      "CC-TO-USDA subnet"  
      IN       PTR      CC-TO-USDA.Arizona.EDU.  
1      IN       PTR      Doc-CC-TO-USDA.Telcom.Arizona.EDU.  
2      IN       ptr      Router.Tucson.ARS.Ag.GOV.  
;  
64     IN       TXT      "AgResEcon-Lab subnet"  
      IN       TXT      "NetMgr: Travis Bowen <TBowen@Ag.Arizona.EDU>"  
      IN       PTR      AgResEcon-Lab.Arizona.EDU.  
      IN       A       255.255.255.192
```

**DOs and DONTs
(Mostly DONTs!)**

DON'T Intermix PTRs for Different Subnets

```
$ORIGIN 89.166.IN-ADDR.ARPA.
```

```
2.2.89.166.in-addr.arpa      .      in      ptr      interlink.ci.tucson.a
2.18.89.166.in-addr.arpa.    in      ptr      infolynx.ci.tucson.az.us.
3.2.89.166.in-addr.arpa.    in      ptr      as400.ci.tucson.az.us.
3.40.89.166.in-addr.arpa.    in      ptr      landfill.ci.tucson.az.us.
3.2.89.166.in-addr.arpa.    in      ptr      pueblo.ci.tucson.az.us.
10.51.89.166.in-addr.arpa    in      ptr      mission.ci.tucson.az.us.
10.53.89.166.in-addr.arpa    in      ptr      colp.ci.tucson.az.us.
10.59.89.166.in-addr.arpa    in      ptr      valencip.ci.tucson.az.us.
10.61.89.166.in-addr.arpa    in      ptr      woodsp.ci.tucson.az.us.
11.16.89.166.in-addr.arpa    in      ptr      jackhamr.ci.tucson.az.us.
```

What a confusing mess!

Use One SOA for All Zone Files

```
$ORIGIN ci.tucson.az.us.  
$INCLUDE city.soa
```

```
$ORIGIN 89.166.in-addr.arpa.  
$INCLUDE city.soa
```

```
$ORIGIN 312.207.206.in-addr.arpa.  
$INCLUDE city.soa
```

Increases likelihood of forgetting to update serial number. Causes unnecessary reload of other zones.

DON'T Choose a Dumb Syntax for Serial Number

```
@      in      soa      Arizona.EDU. Hostmaster.Arizona.EDU. (  
                               9611081 ;      Serial (YY-MM-DD-N)
```

Dumb

```
@      IN      SOA      NS.Opus1.COM.      hostmaster.Opus1.COM. (  
                               1996110601      ; serial number
```

Smart

DON'T Allow Stupid Subdomain Names

- ❖ The Controller's office wanted to name their domain after the building they were housed in: Babcock.Arizona.EDU
- ❖ 12 months later, they had been moved to a new building. Wouldn't they have been sorry!

DON'T Allow Illegal Syntax

- ❖ ... like underscores in names.
 - ❖ It's the DNS administrator's job to know the rules and enforce them

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DO Be Easy to Find

```
TGV.COM text = "Cisco Systems "  
TGV.COM text = "Internet Business Unit"  
TGV.COM text = "101 Cooper Street"  
TGV.COM text = "Santa Cruz, CA 95060"  
TGV.COM text = "(408) 457-5200 for main operator or sales assistance"  
TGV.COM text = "(408) 457-5201 or SERVICE@TGV.COM for technical assistance"  
TGV.COM text = "This zone is being maintained by the UBERserver"
```

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DON'T Let Your Whois Info Get Out of Date

```
$ whois dom interi.com
Interimage Associates, LLC (INTERI-DOM)
  1121 E. Waverly
  Tucson, Arizona, 85719
```

```
Domain Name: INTERI.COM
```

```
Administrative Contact:
```

```
  Hosea, Devin (DH672) hosea@INTERI.COM
  +1 520 623 6085
```

```
Technical Contact, Zone Contact:
```

```
  Snyder, Joel M. (JMS56) Joel_M_Snyder@OPUS1.COM
  +1 520 324 0494 (FAX) +1 520 324 0495 (FAX) +1 520 324 0495
```

```
Record last updated on 14-Aug-95.
```

```
Record created on 14-Aug-95.
```

```
Domain servers in listed order:
```

```
NS.OPUS1.COM          192.245.12.50
NS1.ACES.COM          192.195.240.1
```

**Too bad these guys never
updated their NS records
when they moved!**

Bounce, bounce, bounce!

Appropriate RR usage

If You Want an Alias, use a CNAME

❖ no additional net overhead

```
$ORIGIN Opus1.COM.
```

```
;
```

Kerberos	CNAME	Piano.Opus1.COM.
FTP	CNAME	Opus1.COM.
News	CNAME	Tennis.Opus1.COM.
NNTP	CNAME	Tennis.Opus1.COM.
Gopher	CNAME	Cello.Opus1.COM.
WWW	CNAME	Cello.Opus1.COM.
POP	CNAME	Mail.Opus1.COM.
POP3	CNAME	Mail.Opus1.COM.
SMTP	CNAME	Mail.Opus1.COM.
NTP	CNAME	Cello.Opus1.COM.
Radius	CNAME	Cello.Opus1.COM.
Radius2	CNAME	Piano.Opus1.COM.

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Smart aliases

- ❖ www, ftp, ns
- ❖ service, service service

Multiple A records for cluster-like services

```
$ORIGIN Opus1.COM.  
      IN      A      192.245.12.7  
      IN      A      192.245.12.69  
      IN      A      192.245.12.2
```

Consider DNS round
robin here!

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PTR Records

❖ Just do it

```
$ telnet mailhost.azstarnet.com  
Trying... Connected to MAILHOST.AZSTARNET.COM.
```

```
Connection closed by Foreign Host
```

Are your users tired of seeing this yet?

SOA params

Keep Constants Handy

```
; authoritative data for <insert-domain-here>
;
; useful constants:
;     3600 = 1 hour
;     7200 = 2 hour
;     43200 = 12 hour
;     86400 = 24 hour
;     604800 = 7 days
;     2592000 = 1 month
;     31536000 = 1 year
;
$ORIGIN <insert-domain-here>.
```

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SOA Serial Numbers

- ❖ Avoid the year 2000 problem early, use
YYYYMMDDxx

SOA Refresh Times

- ❖ Refresh times more frequent than 12 hours should not be used.
- ❖ If you are topologically distant (i.e., many hops away from each other), 24 hours is even better.
- ❖ Use 24 hours for most domains, and a longer time for domains which are simply MX records or WWW servers that are very unlikely to move.

SOA Retry Time

- ❖ Normally, network connectivity is pretty good, so a short retry time (on the order of 15 to 30 minutes) is appropriate.

SOA Expiration Time

- ❖ Normally, with well-configured systems, any time longer than a few days is overkill. The expiration should generally be twice as long as the longest conceivable network outage you will ever experience.
- ❖ Values in the range of 10 days to two months are recommended to guard against general emergencies.
- ❖ Consider: the expiration time should be longer than the longest vacation your DNS guru will ever take.

SOA Minimum TTL

- ❖ TTLs shorter than 1 week should not be used.
- ❖ BIND ignores TTLs shorter than 1 week anyway.
- ❖ The exception is when you are preparing to move a popular host.

Admin Netiquette

Secondary Requests

Date: Sun, 11 Dec 1994 17:59 -0800 (PST)
From: randy@psg.com (Randy Bush)
Subject: yasr CHB.COM
To: U of Arizona DNS folk <IPrequest@Arizona.EDU>
Content-type: TEXT/PLAIN; CHARSET=US-ASCII

Telltale subject line

**Customary
email address
for this site**

Would you mind also

secondary chb.com 147.28.0.39 secondary/com/chb

Thanks!

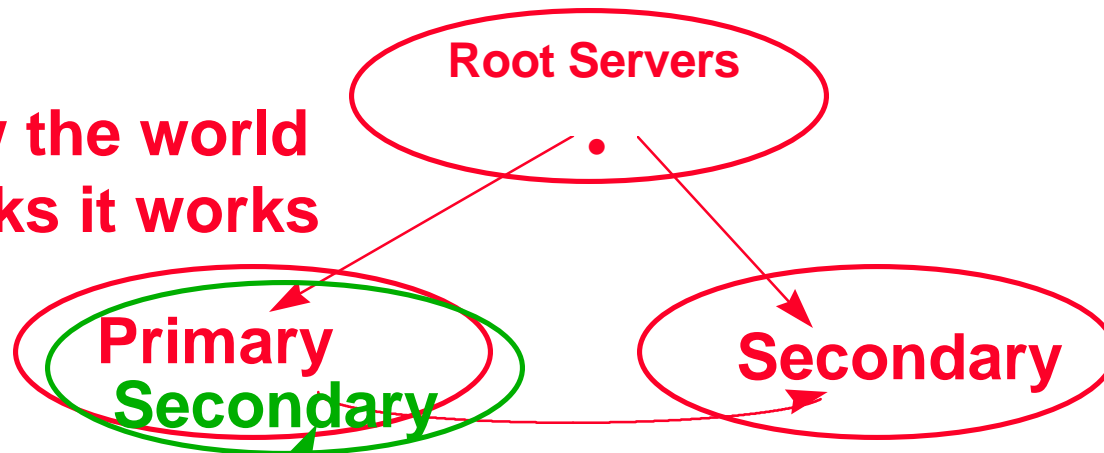
randy

**Syntax ready for
cut-and-paste**

Architectures

Hidden Primaries

How the world
thinks it works



What's really
going on



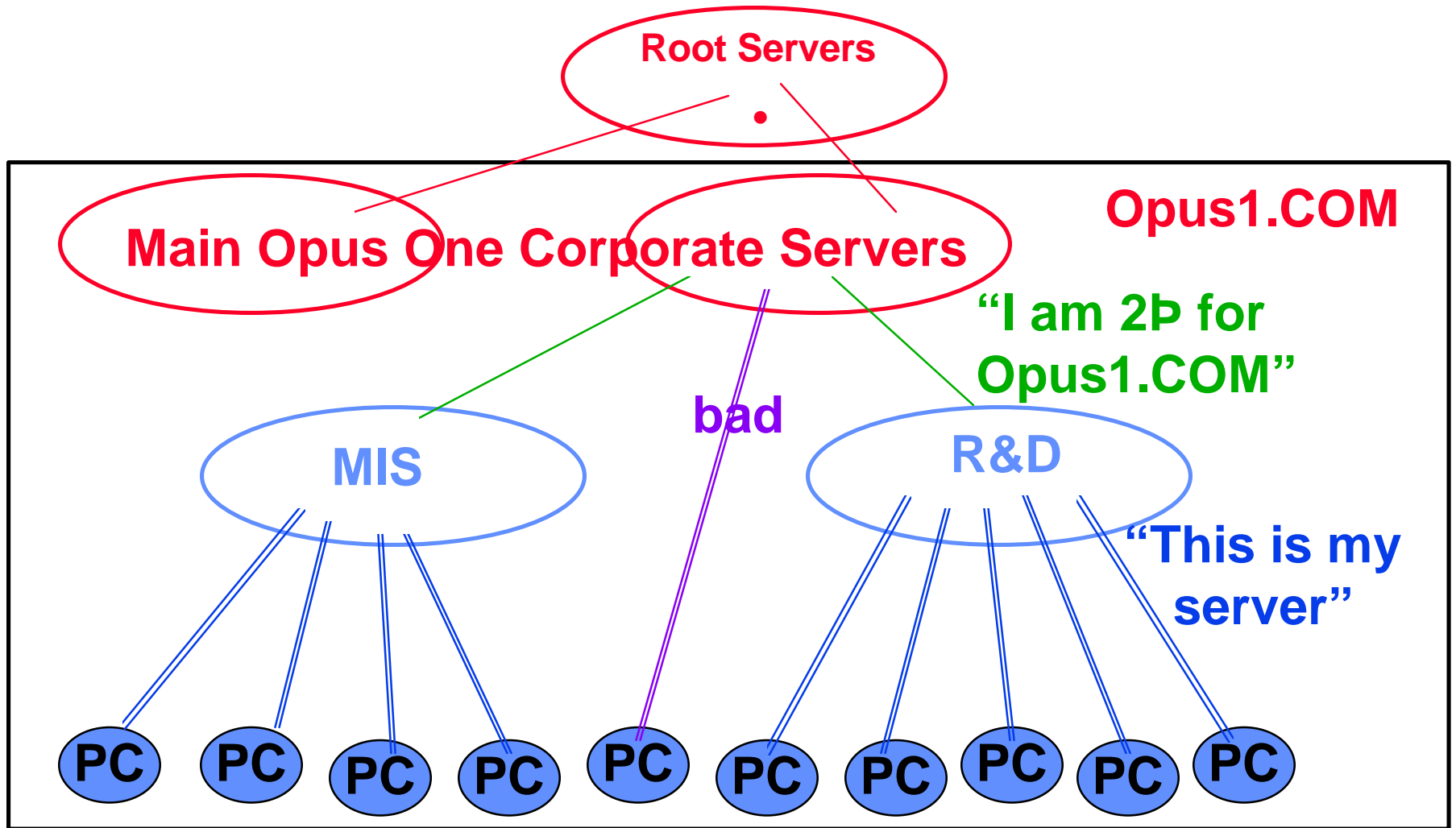
Why?

- Real primary is on other end of very slow line
- Delegation is temporary
- CIDR block; don't want to annoy NIC

Notes

- Good to make NS records reflect reality

Tiered Servers



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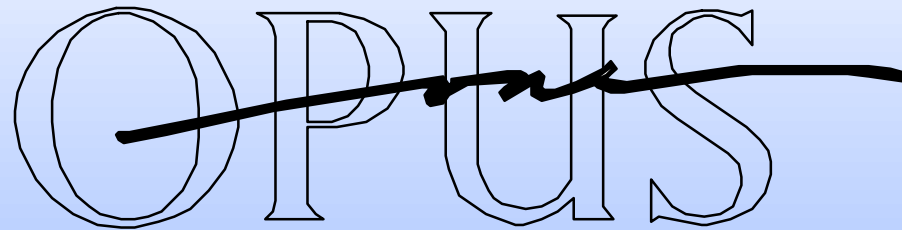
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Client Configs

❖ A secondary is not just for backups

DNS Administration



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<ftp://ftp.opus1.com/decus/dns-admin.powerpoint>