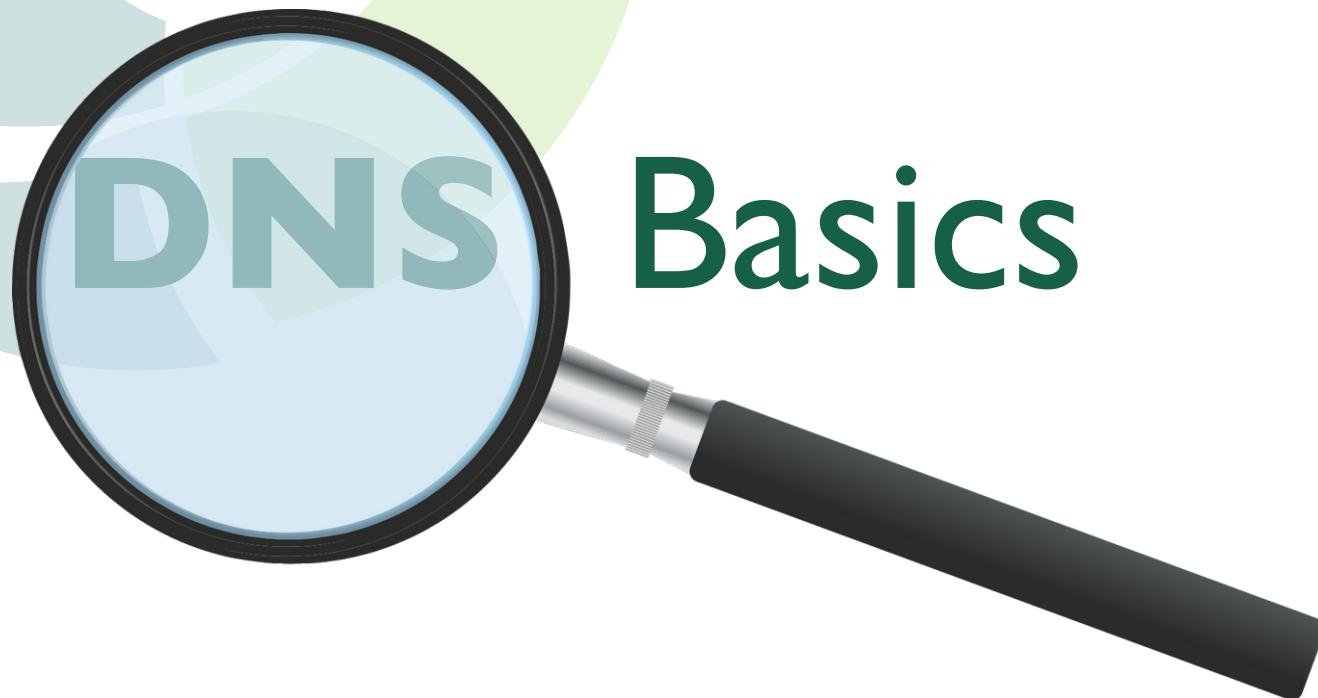


ຍິນດີຕ້ອນຮັບສູ່

CYBER SECURITY WORKSHOP



Basics

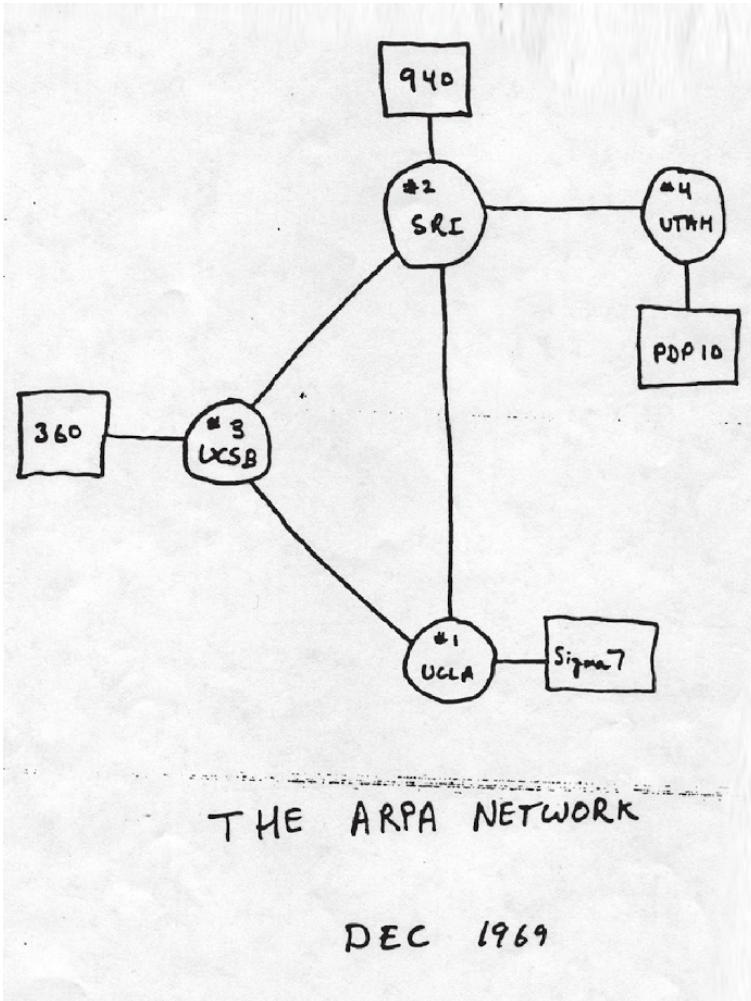
Bangkok
8-9 May 2019

Name Space on the Internet

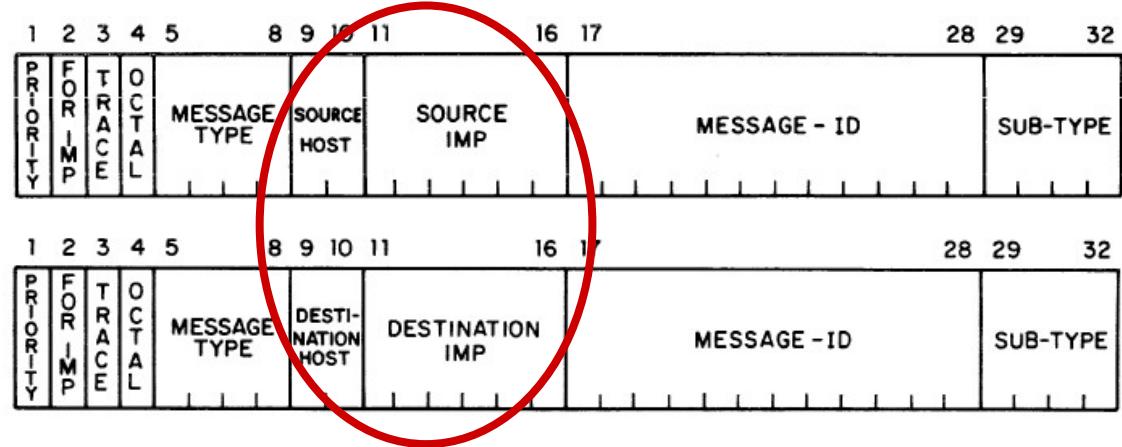


- Finding IP addresses
 - Start with a domain name (human form)
 - Translating to an IP address (machine form)
- What is the IP address of www.bangkok.lol?
 - Client asks server
 - Server responds with answer
 - ... case closed?

Name Space on the Internet



NCP (Network Control Program)



- December 1973
HOSTS.TXT (RFC 606)

Namespace on the Internet

THE ARP
DEC

91

360

* 3
LCSB

ARPANET DIRECTORY
NIC 19275
Jan. 1974

NCP (Network Control Program)

HOST NAMES

HOSTNAME	HOST ADDR (Dec)	LIAISON	STATUS
AFWL-TIP	176	D Hyde (505)247-1711 x3803	TIP, Up 3-74
ALOHA-TIP	164	R Binder (808)948-7066	TIP
AMES-11	208	J Hart (415)965-5935	USER, up 12-73
AMES-67	16	W Hathaway (415)965-6033	SERVER
AMES-TIP	144	W Hathaway (415)965-6033	TIP
ANL	?	L Amiot (312)739-7711 x4309	SERVER, up 2-74
ARPA-DMS	28	S Crocker (202)694-5037	USER, Agency use only
ARPA-TIP	156	S Crocker (202)694-5037	TIP
BBN-11X	5	R Thomas (617)491-1850 x483	Peripheral processor for #69, up 12-73
BBN-1D	232	A McKenzie (617)491-1850 x441	USER
BBN-NCC	40	A McKenzie (617)491-1850 x441	USER
BBN-TENEX	69	R Thomas (617)491-1850 x483	SERVER
BBN-TENEXB	133	R Thomas (617)491-1850 x483	SERVER, Limited
BBN-TESTIP	158	A McKenzie (617)491-1850 x441	TIP (magtape)
BELVOIR	27	W Andrews (703)664-5511	USER, up 6-74
BRL	29	M Romanelli (301)278-4574	USER
CASE-10	13	J Calvin (216)368-2984	SERVER
CCA-TENEX	31	R Winter (617)491-3670	SERVER
CCA-TIP	159	R Winter (617)491-3670	TIP
CMU-10A	78	H Van Zoeren (412)621-2600 x160	SERVER

HOST NAMES

28	29	32
- ID		SUB-TYPE
-----	-----	-----

28	29	32
- ID		SUB-TYPE
-----	-----	-----

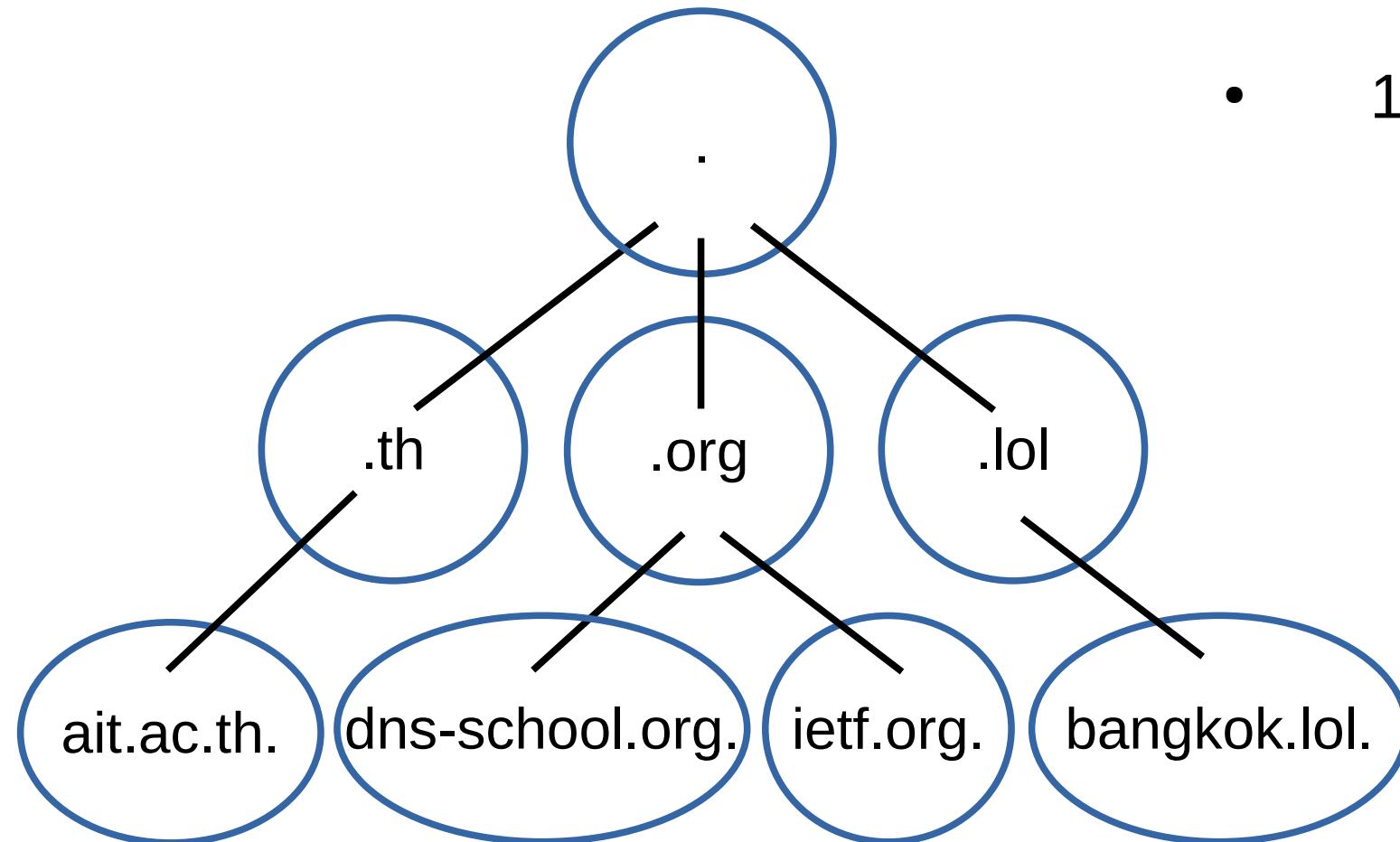
C 606)

Name Spaces on the Internet



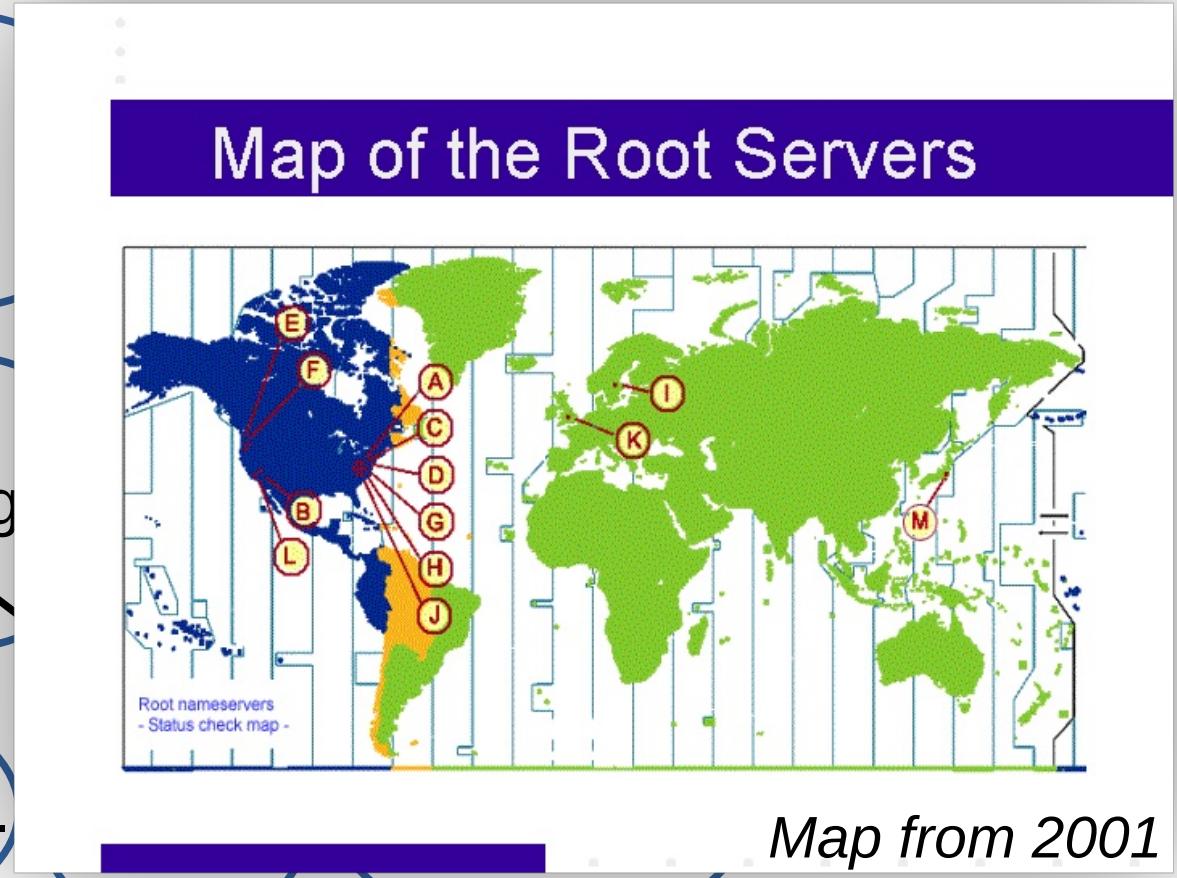
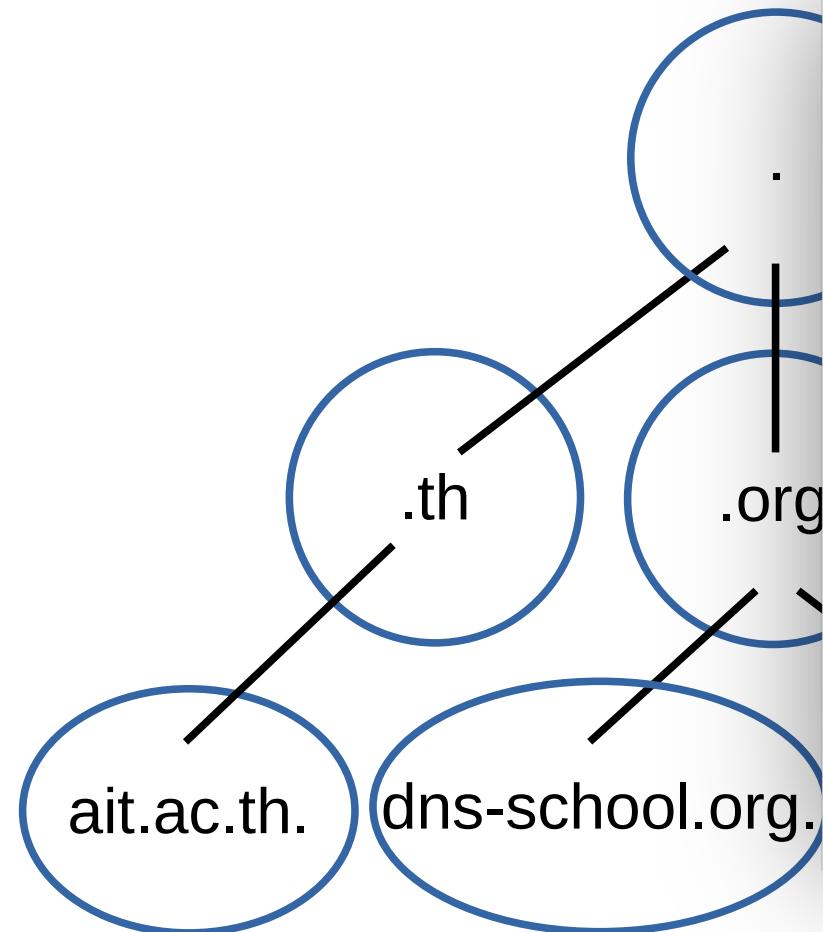
- 1 January 1983 NCP → IP/TCP
flagday
- max 256 → max 4.294.967.296 hosts
- November 1983 DNS (RFC 882)
Domain Name System
- November 1987 STD13
(RFC 1034 & RFC 1035)

Domain Name Space – scale



- 13 root servers

Domain Name Space – scale



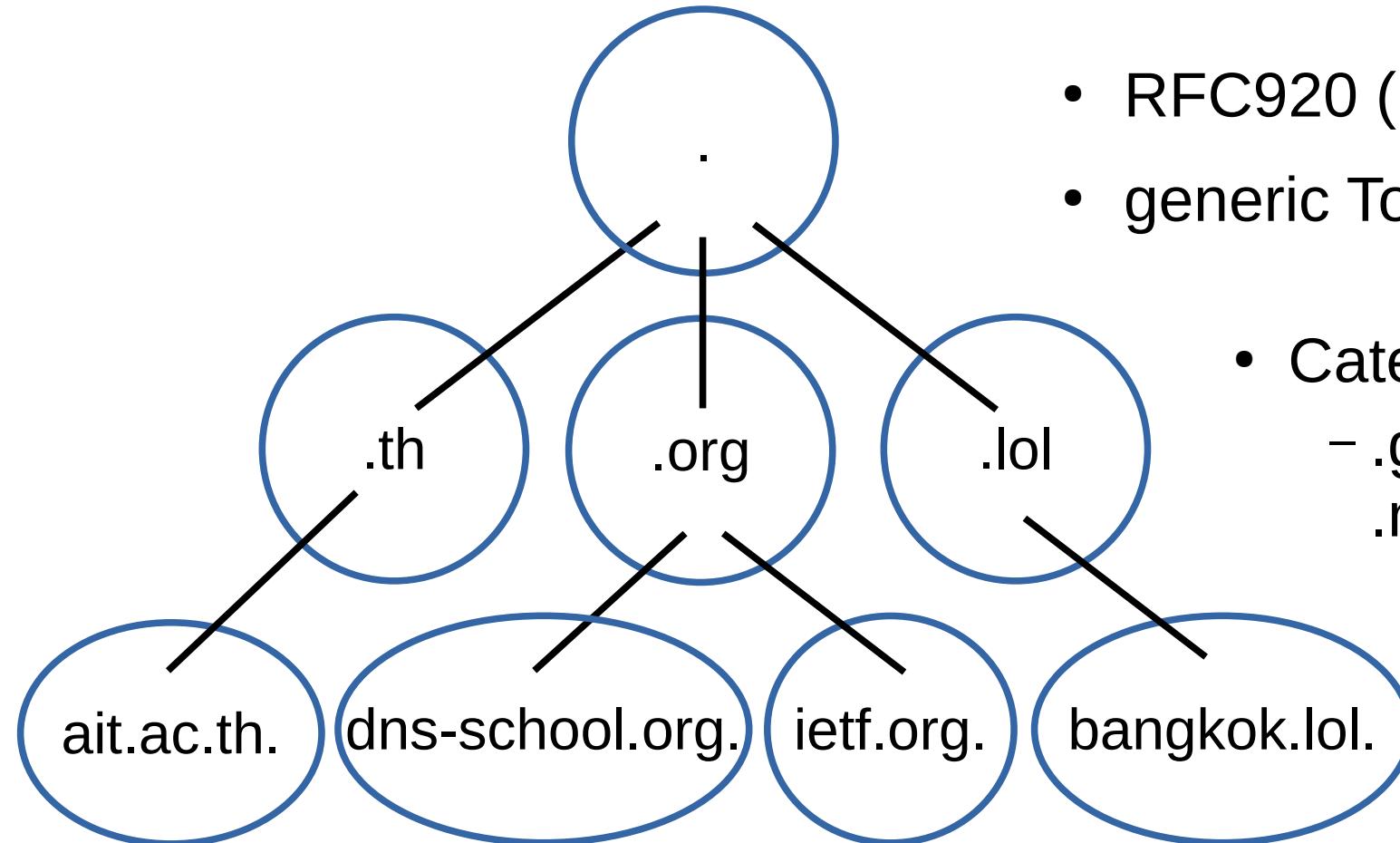
Domain Name Space – scale

A	VeriSign	198.41.0.4 2001:503:BA3E::2:30	H	US Army	128.63.2.53 2001:500:1::803f:235
B	USC-ISI	192.228.79.201 2001:478:65::53	I	Netnod	192.36.148.17 2001:7fe::53
C	Cogent	192.33.4.12 2001:500:2::c	J	VeriSign	192.58.128.30 2001:503:C27::2:30
D	Uni Maryland	199.7.91.13 2001:500:2d::d	K	RIPE NCC	193.0.14.129 2001:7fd::1
E	NASA	192.203.230.10 2001:500:a8::e	L	ICANN	199.7.83.42 2001:500:3::42
F	ISC	192.5.5.241 2001:500:2f::f	M	WIDE Project	202.12.27.33 2001:dc3::35
G	DoD	192.112.36.4 2001:500:12::d0d			

Domain Name Space – scale

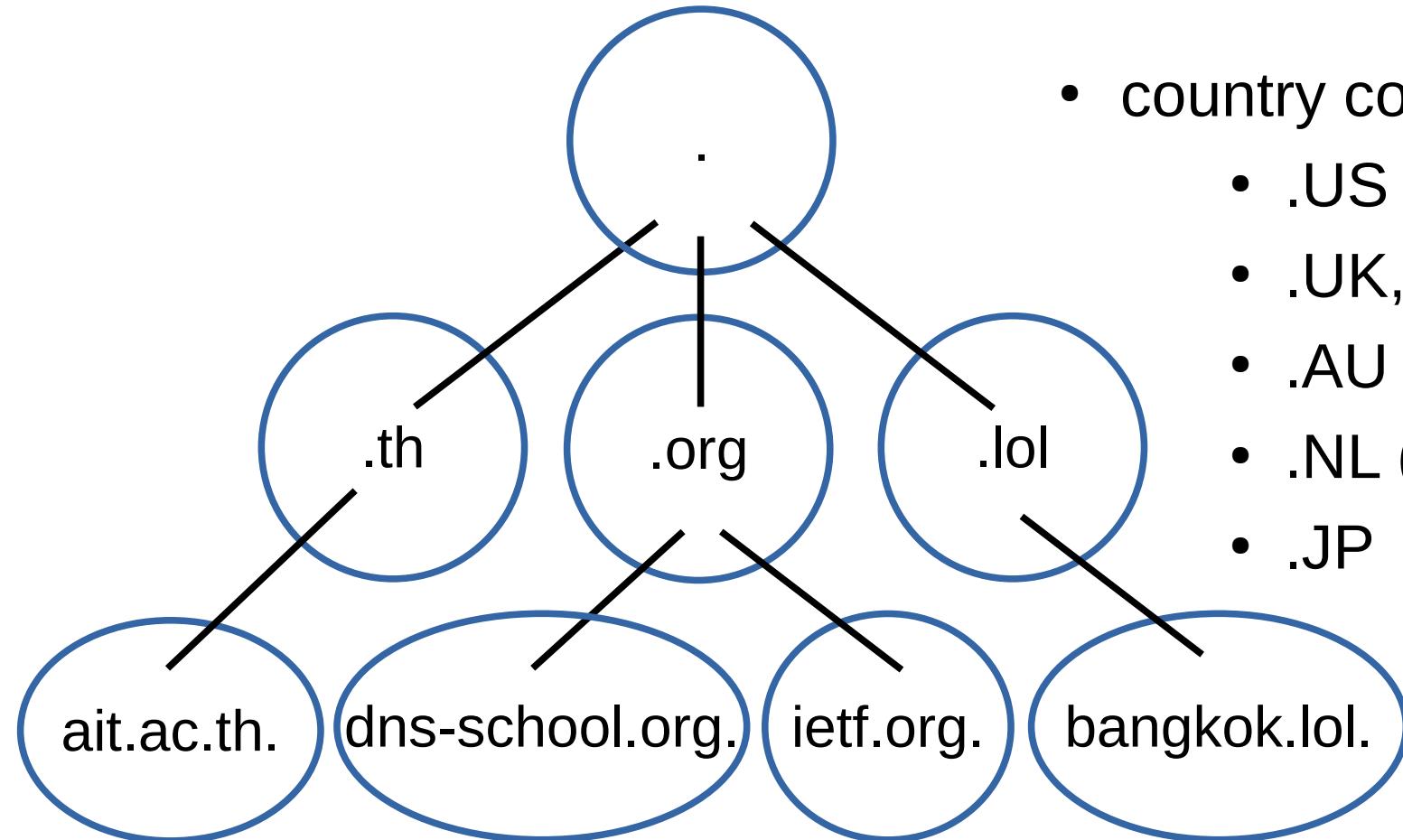


Domain Name Space – scale



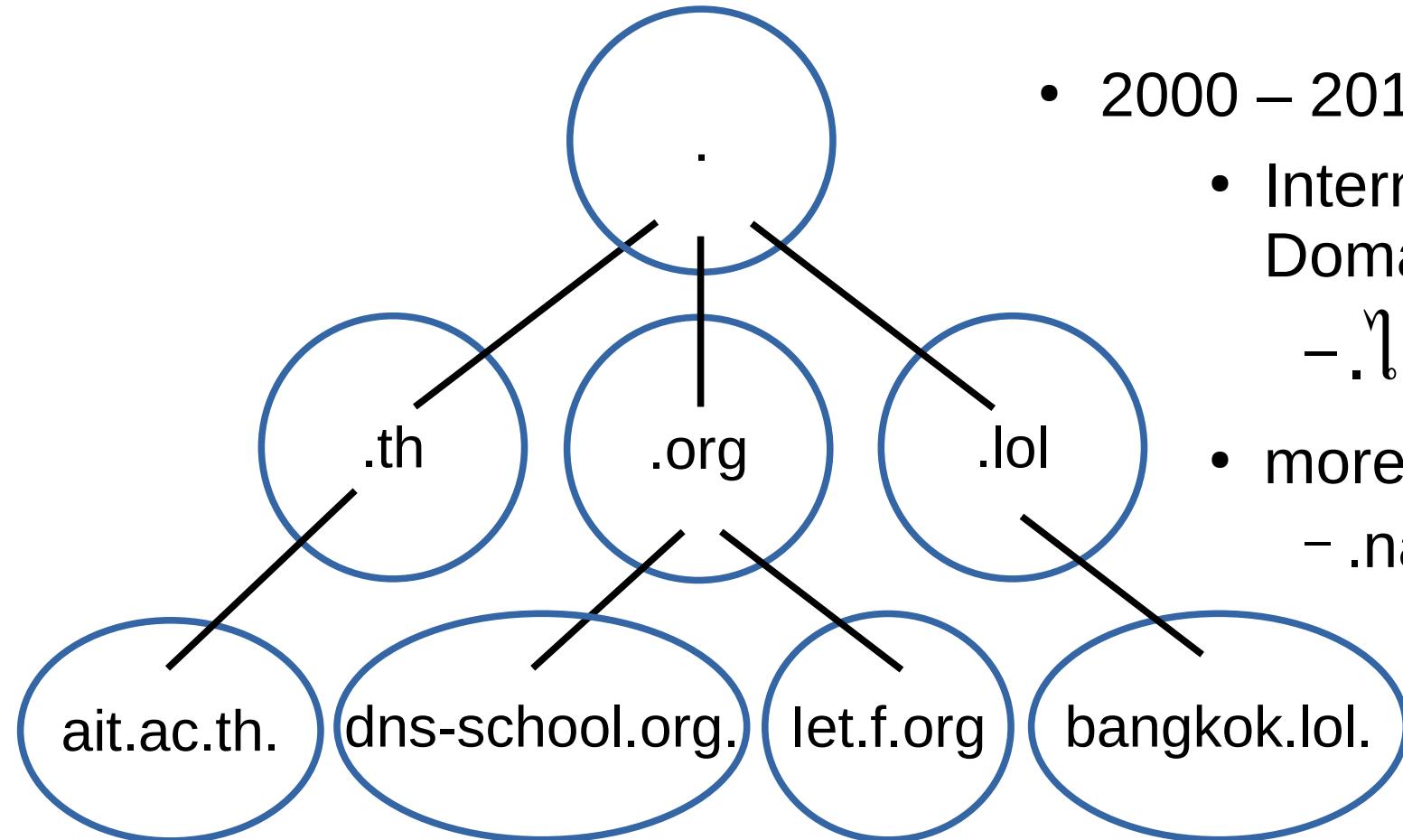
- RFC920 (1984)
- generic Top Level Domains (gTLDs)
- Categories
 - .gov .edu. .com.
.mil .org .net

Domain Name Space – scale



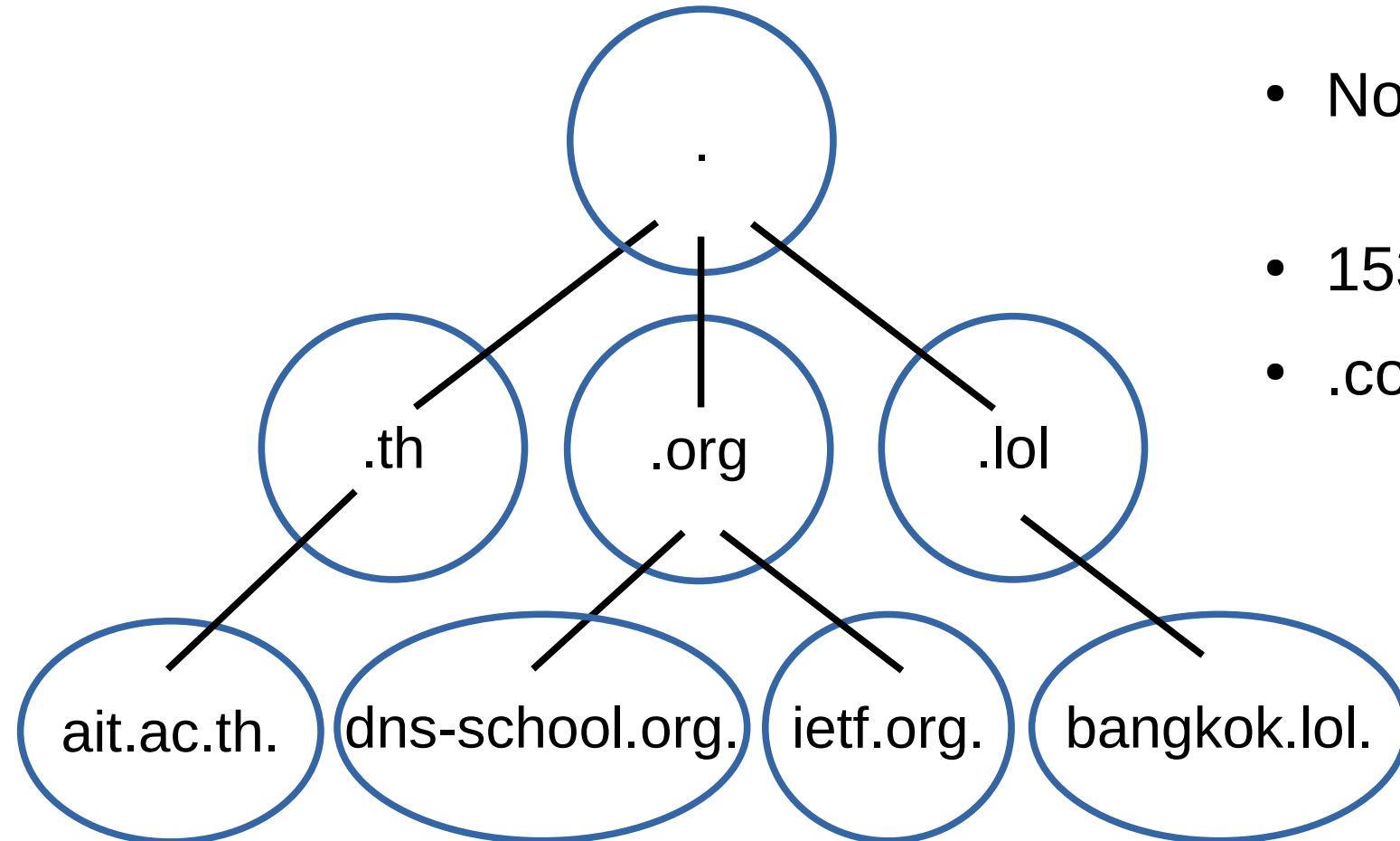
- country code TLD (ccTLD)
 - .US (15 Feb 1985)
 - .UK, GB (24 Jul '85)
 - .AU (5 Mar 1986)
 - .NL (25 Apr 1986)
 - .JP (5 Aug 1986)
 - .TH (1988)

Domain Name Space – scale



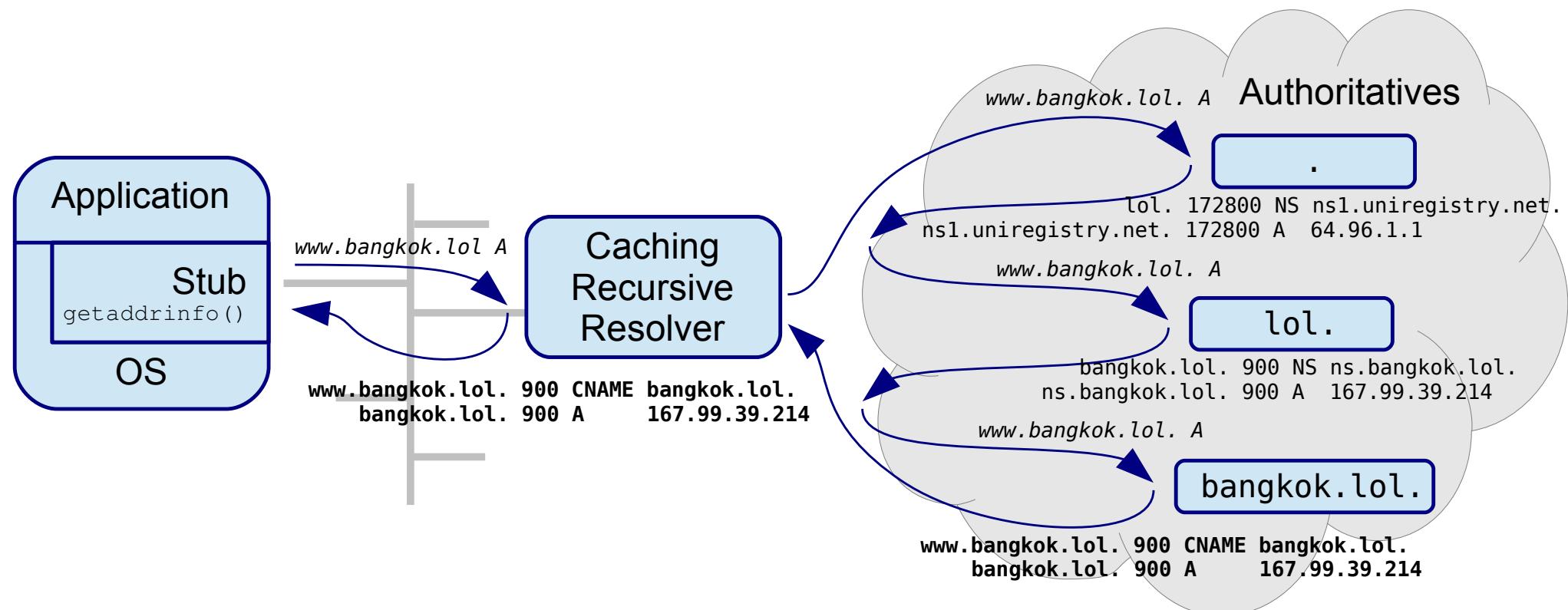
- 2000 – 2012
 - Internationalized Domain Names
 - .ไทย
 - more gTLDs, including
 - .name .pro .biz
(restricted)

Domain Name Space – scale



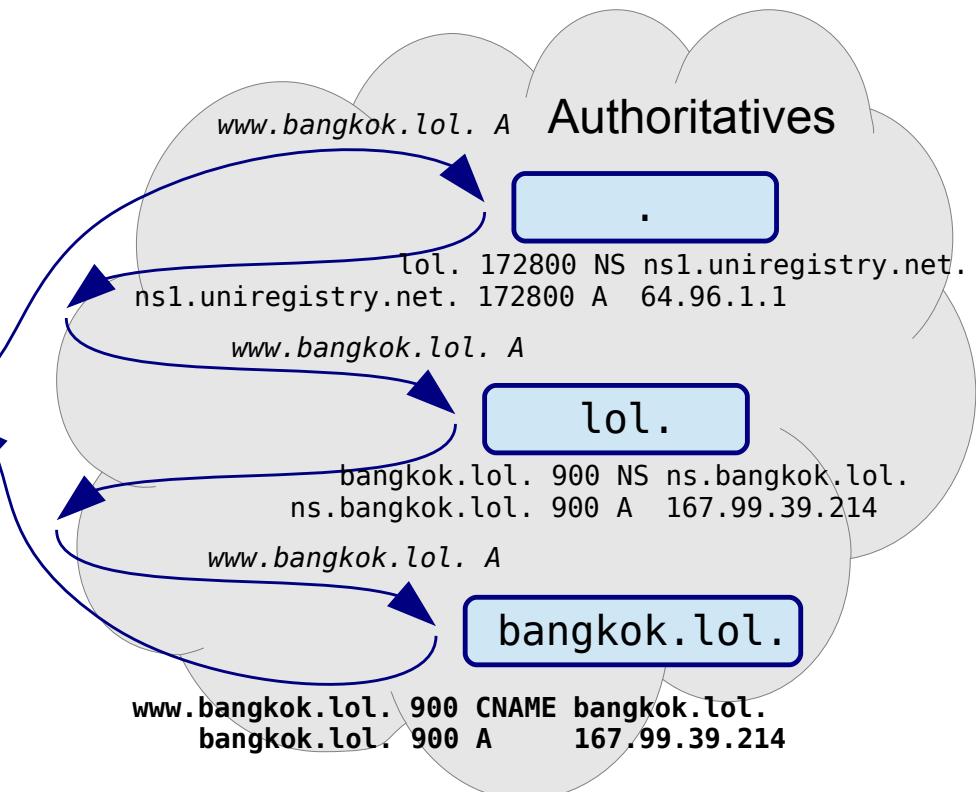
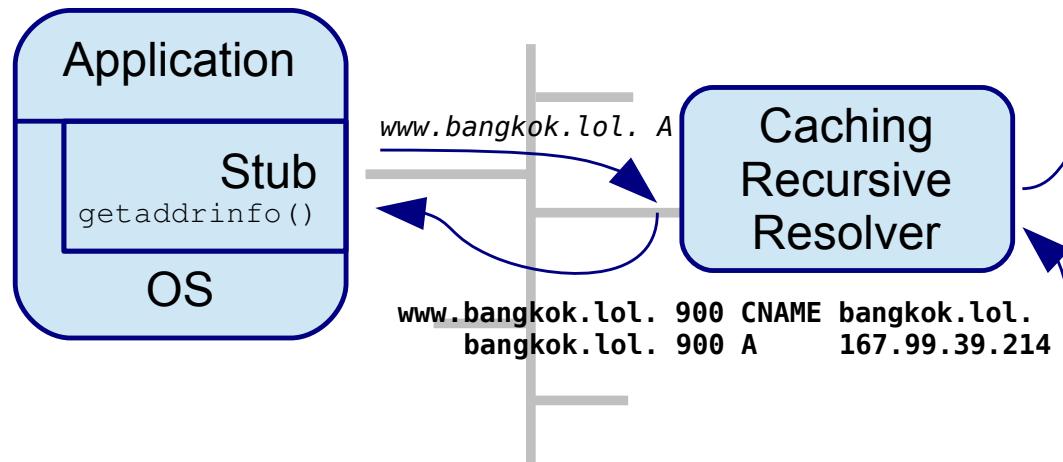
- Now: Unlimited
\$186,000
- 1532 TLDs
- .com 141,600,000
.tk 23,700,000
.de 14,600,000
.nl 5,500,000
.th ?

Domain Name System - scale



Domain Name System - scale

- **UDP** = No State on authoritatives
- **Caching Recursive Resolvers**:
 - Reduce load to authoritatives
 - Reduce latency to stub



Lab time!



- Hands on: <http://bangkok.lol/>
- 1. Setup a Caching Recursive Resolver