Ripe 57

Dubai, 26-30 October 2008

GCC IDN trial& IDNS Backend Architecture

Amani Mohamed Bin Sewaif

Sr. Engineer Service Operation & Maintenance – Hosting/IO

Central Engineering

Etisalat

United Arab Emirates

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Agenda

- Introduction
- Overview of GCC IDN trial project
- Targets to achieve for IDN core
- Ideas & options we considered
- IDN backend Infrastructure

Etisalat Services

http://www.etisalat.ae/

Home and Business Services:

- Narrowband Access
- Broadband Access
- Leased Circuits
- VPN
- 2.5G, 3G & 3.5G Mobile Services
- IPTV, VOD Services
- Triple Play
- Data Center Services
- Value Added Services
- & More

Welcome to Etisalat

Emirates Telecommunications Corporation- Etisalat

Etisalat has been the telecommunications service provider in the United Arab Emirates since 1976 and is the number one mobile operator in the UAE. For three decades, since the birth of the UAE, it has played a key role in driving and supporting the nation's prosperity. Famous for over 30 years for delivering technological excellence, innovation and reliability, Etisalat is on track to be a top 20 Global Telco by 2010 - pioneering technology for tomorrow's customers.

Introduction

- **Internationalized Domain Names (IDNs)** are Multilingual domain names represented by local language characters. The domain name has letters or characters from non-ASCII scripts such as Arabic.

- The common languages for GCC are Arabic. There is a high demand to provide localize domain name to facilitate non-English Internet experience.

- To demonstrate to global Internet community that we are familiar with IDN technology and can operate IDNS Solution in order to speed the implementation of IDNS TLD in the region.

Overview of GCC IDN trial project

http://www.arabic-domains.org

Mission

- Implementing a test bed for Arabic domain names (ADN) in the Arab world. This will allow all Arab countries to early experience the use of Arabic domain names, identify their needs, agree on standards, locate possible problems, and develop required tools and policies.

Strategic Objectives

- The project is expected to contribute to strategic objectives, such as:
- To establish and implement Arabic domain names.
- To increase the Internet use in the Arab world by addressing linguistic barriers facing Arabic-speaking users.
- To promote the use of Arabic language and to increase the Arabic content on the Internet.
- To promote Arab cultural identity on the Internet.

Overview of GCC IDN trial project

http://www.arabic-domains.org

Team Structure

- Two committees have been created for the management and operation of the project: A Steering Committee and a Technical Committee.

Resources

- Each participating country is expected to allocate all the needed resources including a DNS server and set up at least one DNS (primary) server for its Arabic ccTLD. The existing Arabic root servers that are being used by the GCC Pilot Project will be available for this project.

Duration

- This project will continue as a test bed until the recognition of Arabic TLDs (both gTLDs and ccTLDs) by concerned international bodies, e.g., ICANN and ITU.

Overview of GCC IDN trial project

http://www.arabic-domains.org

Deliverables

- Establish and activate the Steering and Technical Committees
- Prepare and maintain a website for the project.
- Prepare the Arabic DNS root servers.
- Prepare the Arabic ccTLD servers for the participating countries and connect them with the Arabic root servers.
- Register and test Arabic domain names.
- Test and develop tools supporting the use of Arabic domain names and DNS.
- Test and develop end-user applications (browsers, email clients, …….etc) to ensure support of Arabic domain names
- Draft technical guidelines.
- Define policies and regulations for registering Arabic domain names.
- Participate in local and regional activities related to Arabic domain names.

Participated Countries

http://www.arabic-domains.org

- United Arab Emirates
- Kingdom of Saudi Arabia
- State of Qatar
- Sultanate of Oman
- State Of Palestine
- Arab Republic Of Egypt
- Republic Of Tunisia
- Syrian Arab Republic
- Hashemite Kingdom of Jordan
- Kingdom of Morocco
- Great Socialist People's Libyan Arab Jamahiriya

✱ All Arab countries are welcomed to participate in this pilot project.

Targets to achieve

For IDNS core

To have IDNS architecture which is :

- Simple
- Redundant
- Decentralized
- Easy troubleshooting
- As close as possible to the real setup
- No impact on regular DNS
- No extra requirements for the end user
- Simultaneous experience of regular DNS and IDNS lookups

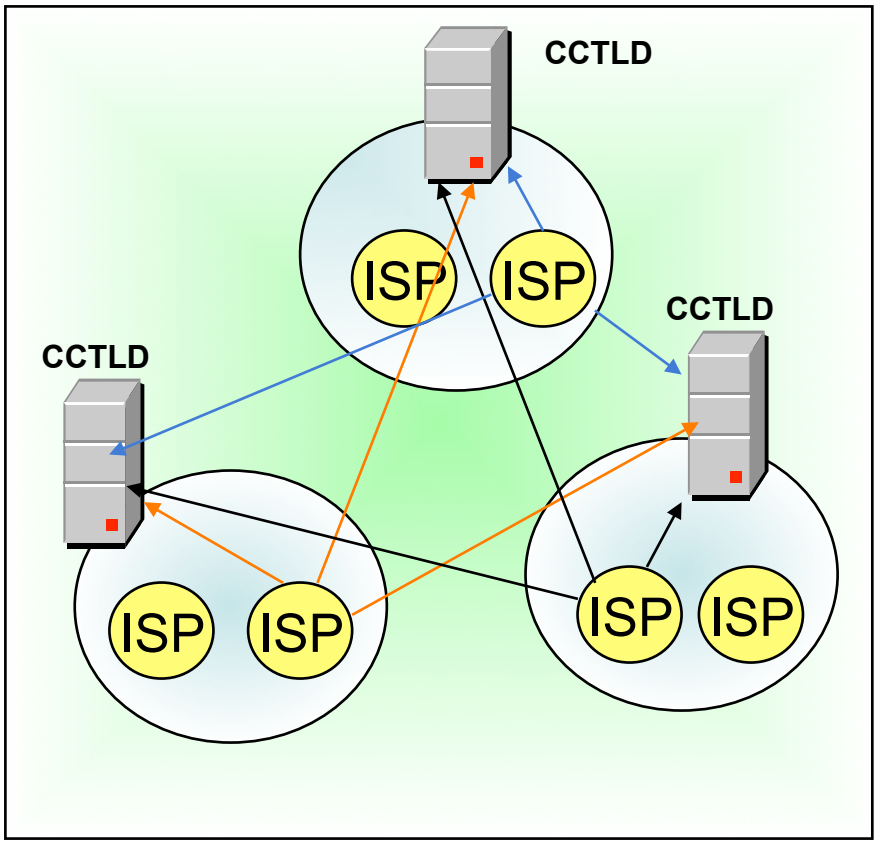
Ideas & options we considered

IDEAS were

- Forwarding
- Add new .TLD in the Hint file
- Alter the bind source
- Client Plug-in
- Merge Root zones
- Stub zones
- Slaving every ccTLD Zone on IDN Root

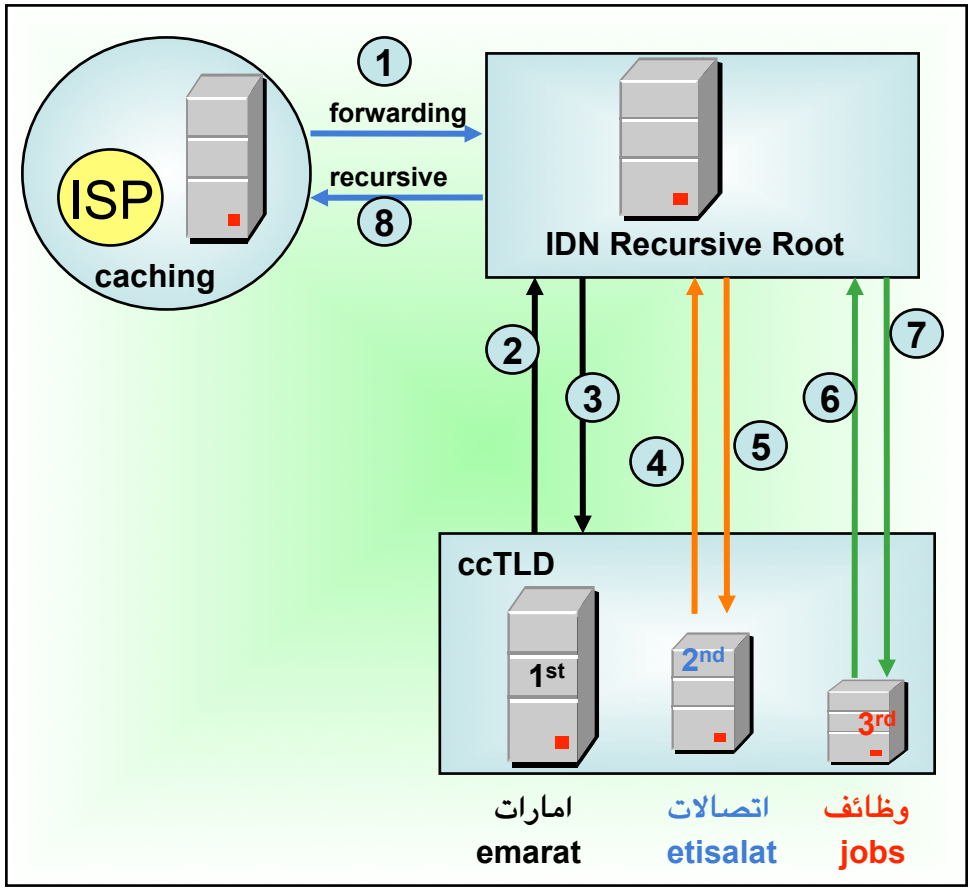
Forwarding

- Forward per zones to each ccTLD
- Impossible to manage 22 countries with many ISP
- Hard Troubleshooting
- Further Sub Delegation not possible
- Limiting the experience
- Not following best practices



Forwarding + Recursive Root

- Central Root Servers
- Root Receiving Recursive requests
- Configure zone forwarding
- Support further delegation
- Huge dependency on the root
- Different than regular DNS resolution
- Requires powerful Root
- Limiting experience to manage for trial participants



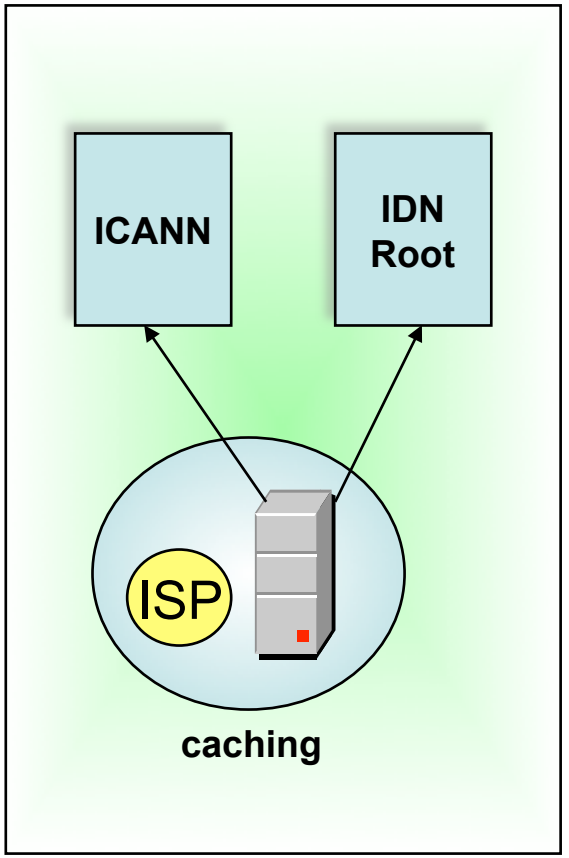
New .TLD in Hint File

- Add New .TLD in hint file
- Easy to configure
- **Bind** ignores non root entries in hint file
- Such setup didn't work

```
; <<<<<<<<<<<   HINT FILE   >>>>>>>>>>>>>>

.                       3600000  IN  NS    A.ROOT
-SERVERS.NET.
A.ROOT-SERVERS.NET.     3600000     A     198.41.0.4
A.ROOT-SERVERS.NET.     3600000     AAAA
 2001:503:BA3E::2:30
;
; formerly NS1.ISI.EDU

xn--mgbaam7a8h          IN NS   ns1.uaenic.ae.
xn--mgbaam7a8h          IN NS   ns2.uaenic.ae.
ns1.uaenic.ae.          IN A 213.42.0.226
ns2.uaenic.ae.          IN A 195.229.0.186

;
;
;
```

Alter the Bind Code

- Divert new TLD queries to second root (IDN)
- No changes in **named.conf**
- Hard to accept across the communities
- Maintenance responsibility



Client Plug-in

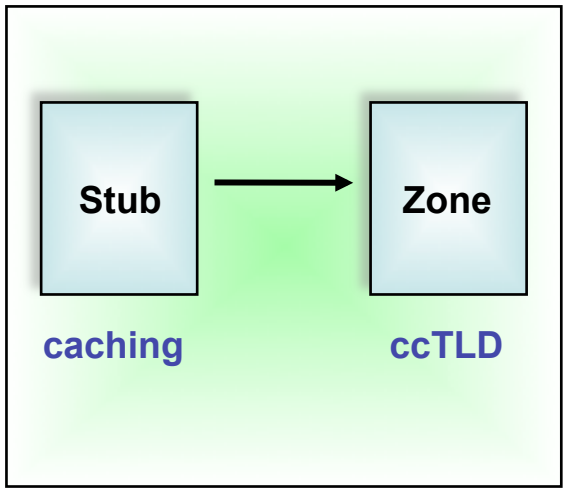
- Need to be developed
- Client based approach
- Different than future implementation
- It is done and can be downloaded from:
  http://www.arabic-domains.org/tools.php

Merge Root zones

- Reconfigure the caching server to new root
- Zone-transfer both root zones and merge them into single Root zone, update regularly
- And reconfigure just a hint file
- Risky & complete dependency on new root
- Require carrier – grade infrastructure
- Expensive
- Not trusted by all

Stub Zones

- Better Approach than forwarding
- No recursive queries
- Sub delegations are possible
- Troubleshooting close to normal model
- Without root – again hard to manage



How to simplify management and provide similar DNS experience?

Can we try to use a STUB Zone against the IDN Root zone?

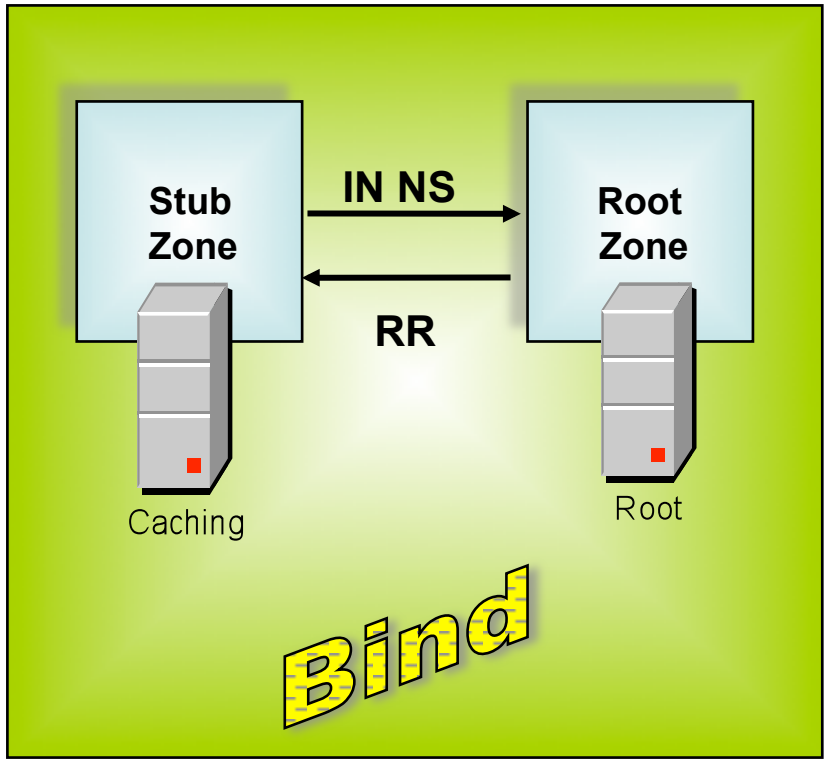
- Ns record + glue available in the IDNS root zones
- Easy administration
- Troubleshooting close to regular DNS

It didn't work

```
; <<<<<<<<<   Master Root Zone File   >>>>>>>>>
@ IN SOA ar-root.nic.ae. hostmaster.mail.emirates.net.ae. (
                    2007020504      ; Serial
                    10800   ; Refresh after 3 hours
                    300     ; Retry after 5 minutes
                    604800  ; Expire after 1 week
                    10800 ) ; Minimum TTL of 3 hrs
; root pointing to cctld
                    IN NS   ar-root.nic.ae.
                    IN NS   ar-root.nic.net.sa.

xn--mgbaam7a8h          IN NS   ns1.uaenic.ae.
xn--mgbaam7a8h          IN NS   ns2.uaenic.ae.

ns1.uaenic.ae.          IN A 213.42.0.226
ns2.uaenic.ae.          IN A 195.229.0.186
;
;
```

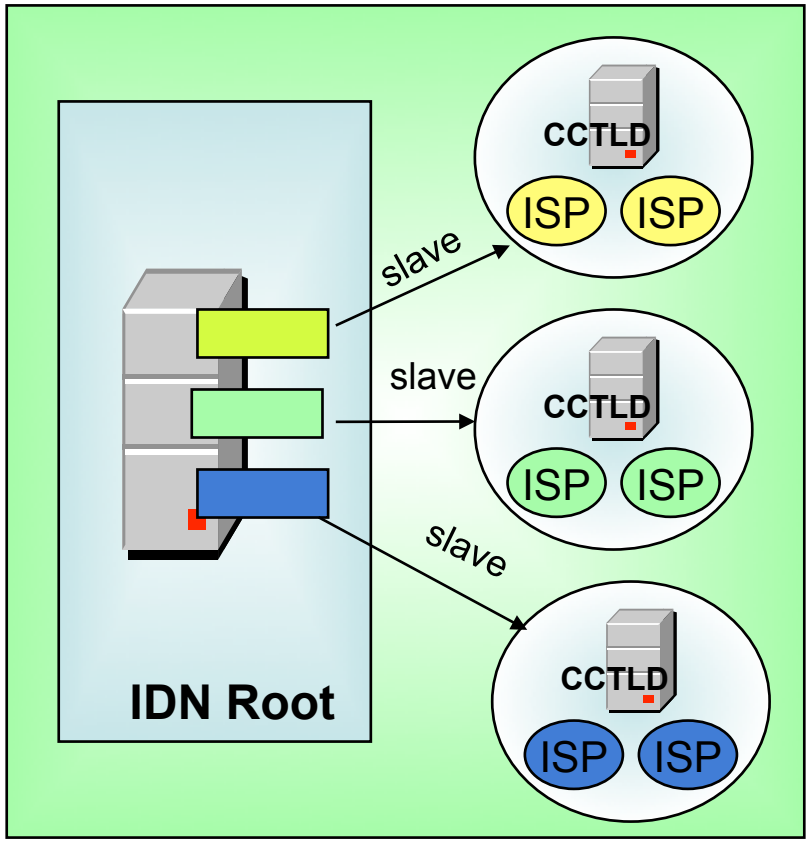
How Stub zone Works in 'Bind'

- Get the NS record
- Follow the NS
- But if the server is not authoritative then it will falls.
- Root Server is not authoritative for ccTLD Zones records
- => so this fails



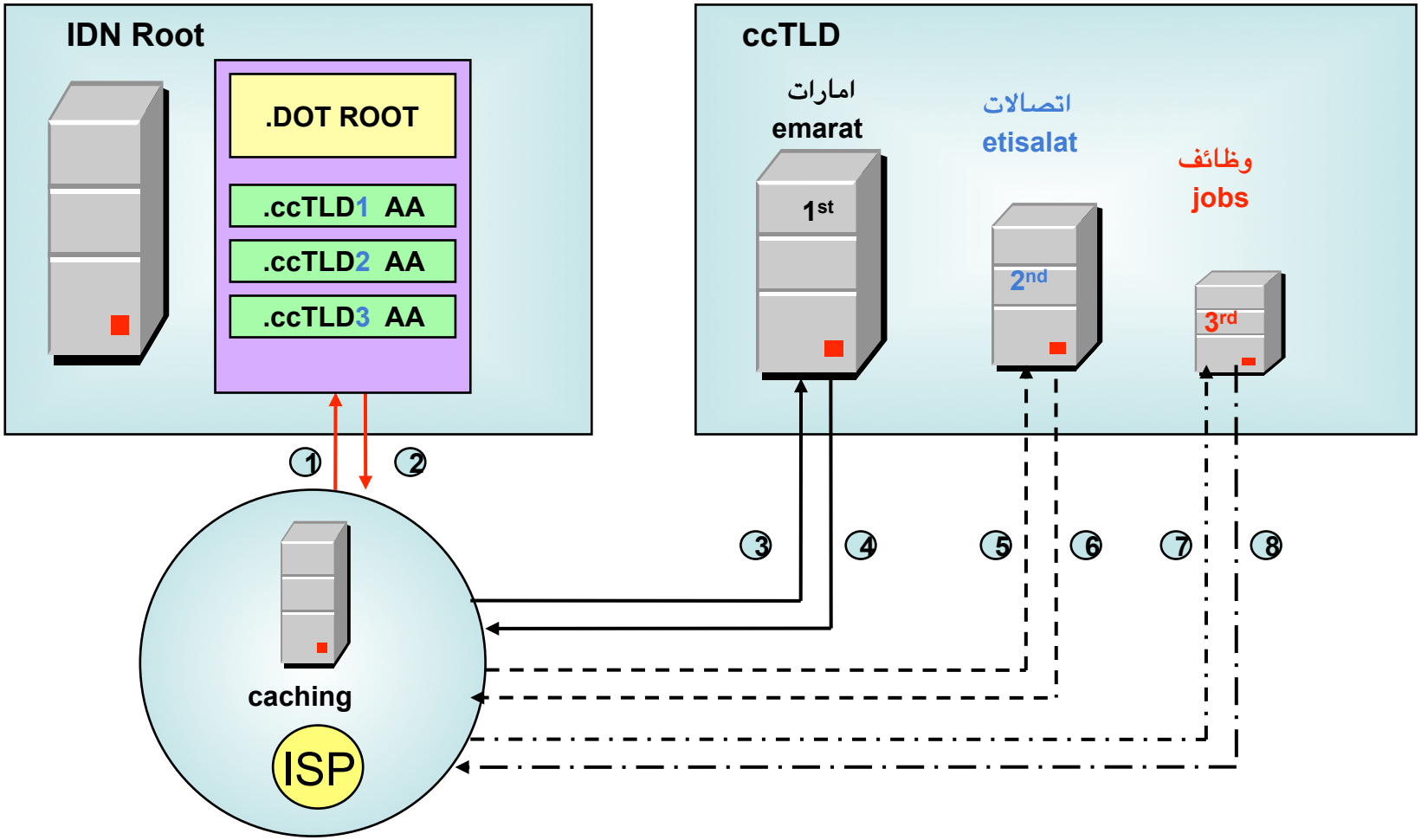
Slaving every ccTLD Zone on IDN Root

- Good idea, but:
- Zone transfer trust issues
- Zone transfer requirement not supported by all countries
- ccTLD Policy/security issues raised



IDN backend Final Design

No Slave Zones, just a "cctld mini-zone" in the root



Configuration required for Caching Bind

- Caching bind
- same configuration for all
- Predefined for all GCC Countries
- Resolution close to regular DNS
- Distributed control
- Easier troubleshooting

```
// named.conf
// STUB ZONES FRO EVERY IDN TLD AS PER
THE ARABIC ROOT PROJECT SETUP
include "arabic_cctld_stub.inc";
```

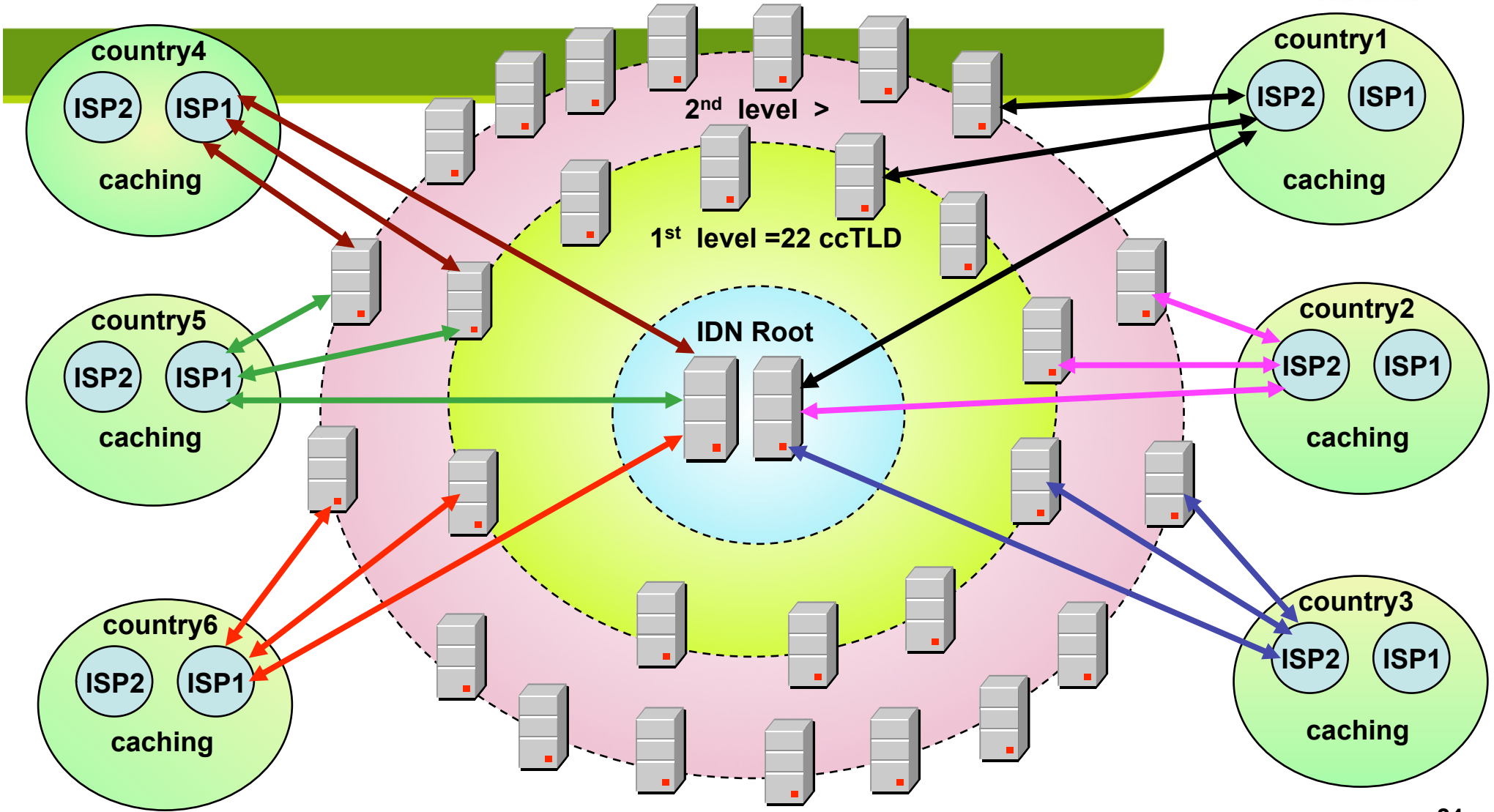
```
; arabic_cctld_stub.inc

// STUB ZONE FOR ARABIC IDNS PROJECTS

zone "xn--igbhzh7gpa" {
        type stub;
        file "stub/jo.idn.zone";
        masters { 213.42.20.76; 212.26.18.12; };
/* SAME MASTER FOR ALL IDN ROOTS*/
};

zone "xn--mgbaam7a8h" {  //no hamza
        type stub;
        file "stub/ae.idn.zone";
        masters { 213.42.20.76; 212.26.18.12; };
};
/* SAME MASTER FOR ALL IDN ROOTS*/
```

How Stub zone Works in 'Nominum' ?

Bind Stub and Nominum Stub are different

- We used Nominum CNS for IDN trial
- It doesn't get the ccTLD NS
- It doesn't follow the ccTLD NS
- Static tunnel
- But Delegation works
- Not useful for IDNS root concept
- Majority uses bind
- Workaround script provided by Nominum (Thank you) to update the cns.conf in case of ccTLD change

IDN backend infrastructure Diagram



Thanks

amani@ies.etisalat.ae

Zain Al Abdeen

Raed Al-Fayez

Abdulaziz Al-Zoman

Ladislav Vobr

Ahmed Al Saadi

Abdulla Bushlaibi