Etisalat DNS Operational Experiences

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28th October 2008

Outline

- Etisalat Introduction
- Network Convergence & role of DNS
- Etisalat DNS Evolution
- Etisalat DNS Today
- Near Future Plans
- Current Statistics
- Things to Monitor
- Tools used
- Points learned

About Etisalat
Etisalat Services (ALL IP Based)

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

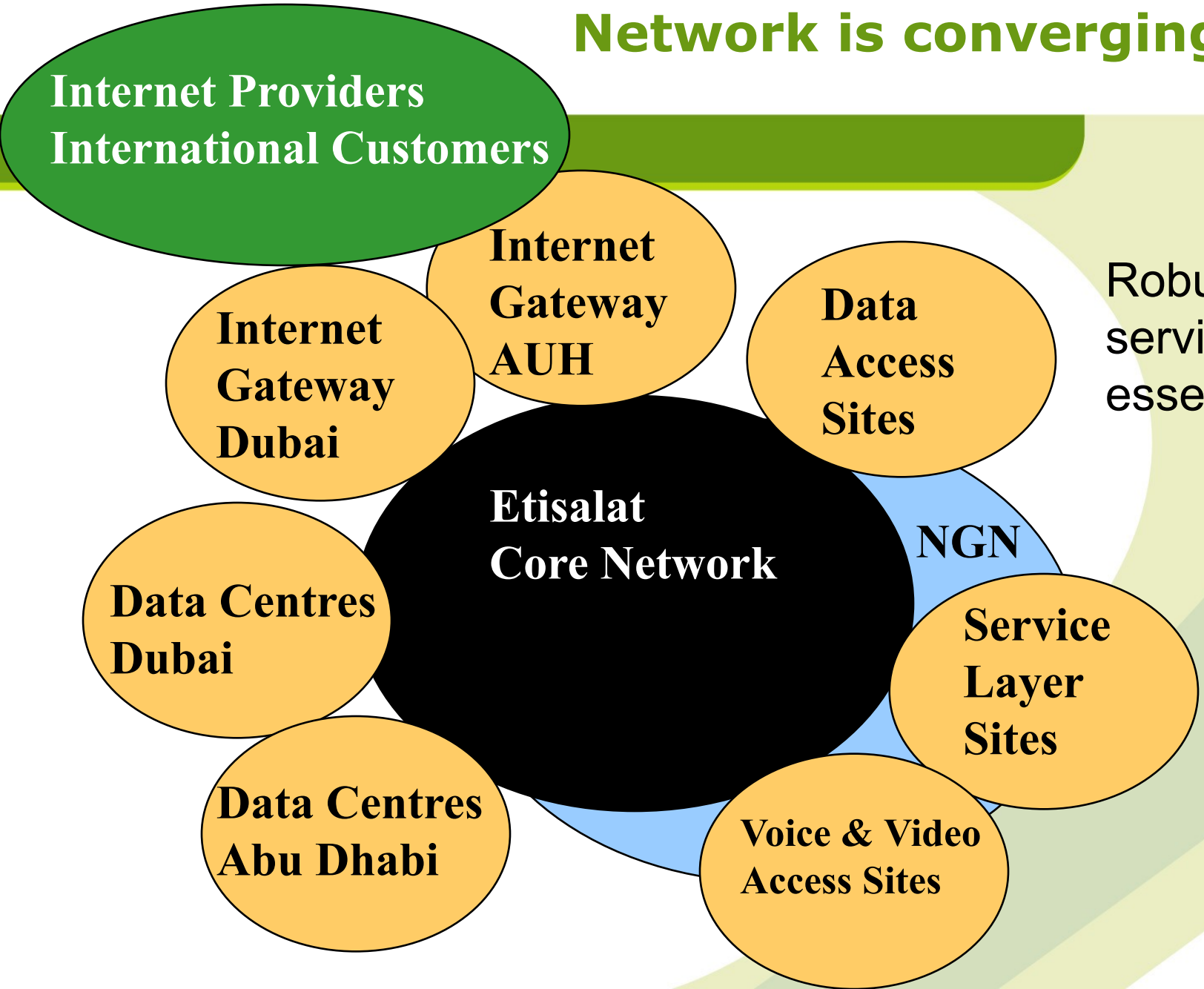
Welcome to Etisalat

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.

So far Etisalat has established it's present in more than 17 countries and is a multinational Corporation.

Network is converging



Robust DNS services are essential

Etisalat DNS Evolution

1996

- 1 server
  - .ae CCTLD zone
  - Customer Zones
  - Recursion/Caching Enabled
  - SMTP,WEB…
  - All together

Etisalat DNS Evolution

1998

- 2 master, 1 slave
- Not used to master slave concept, takes more time to update

1999

- 1 hidden master 3 slaves
- Master/slave concept accepted

2001

- Separation of ccTLD group
- Master + 2 slaves for .AE and in-addr.arpa zones
- Increased availability for .AE
- Independent from Public ISP Caching Service

Etisalat DNS Evolution

2002

Secondary agreements for .ae with ISC, RIPE, APNIC

- Geographical distribution
- Better availability

2003

ENUM +971 Ripe delegation

2004

Separation of Public DNS Caching Services and Authoritative Services

- Increased availability
- Increased security
- Using “recursive & non-recursive views” in Bind, successful
- Recursive traffic was redirected to a how-to web-page using root zone wildcard

Etisalat DNS Evolution

2004

Anycasted .ae ccTLD Service

- Anycasted over 2 AS numbers

2005

Separate Caching Service for Internal Infrastructure (INS)

- Independent caching service in case of Public Threats (Mail queues, proxies..)
- Anycasted over 2 Datacentres
- Little Extra cost, but easy operation under unexpected conditions

IDN Trial

- 2 IDN Root Servers established UAE+SA
- 22 countries joined
- More details in tomorrow's presentation

Etisalat DNS Evolution

2006

eGRX - Emirates GPRS Exchange

- .gprs Slave Root Servers Setup

2007

Move to Intel/Redhat architecture

- Mix of Sun Sparc / Intel/ Redhat
- Good performance / cost ratio

2008

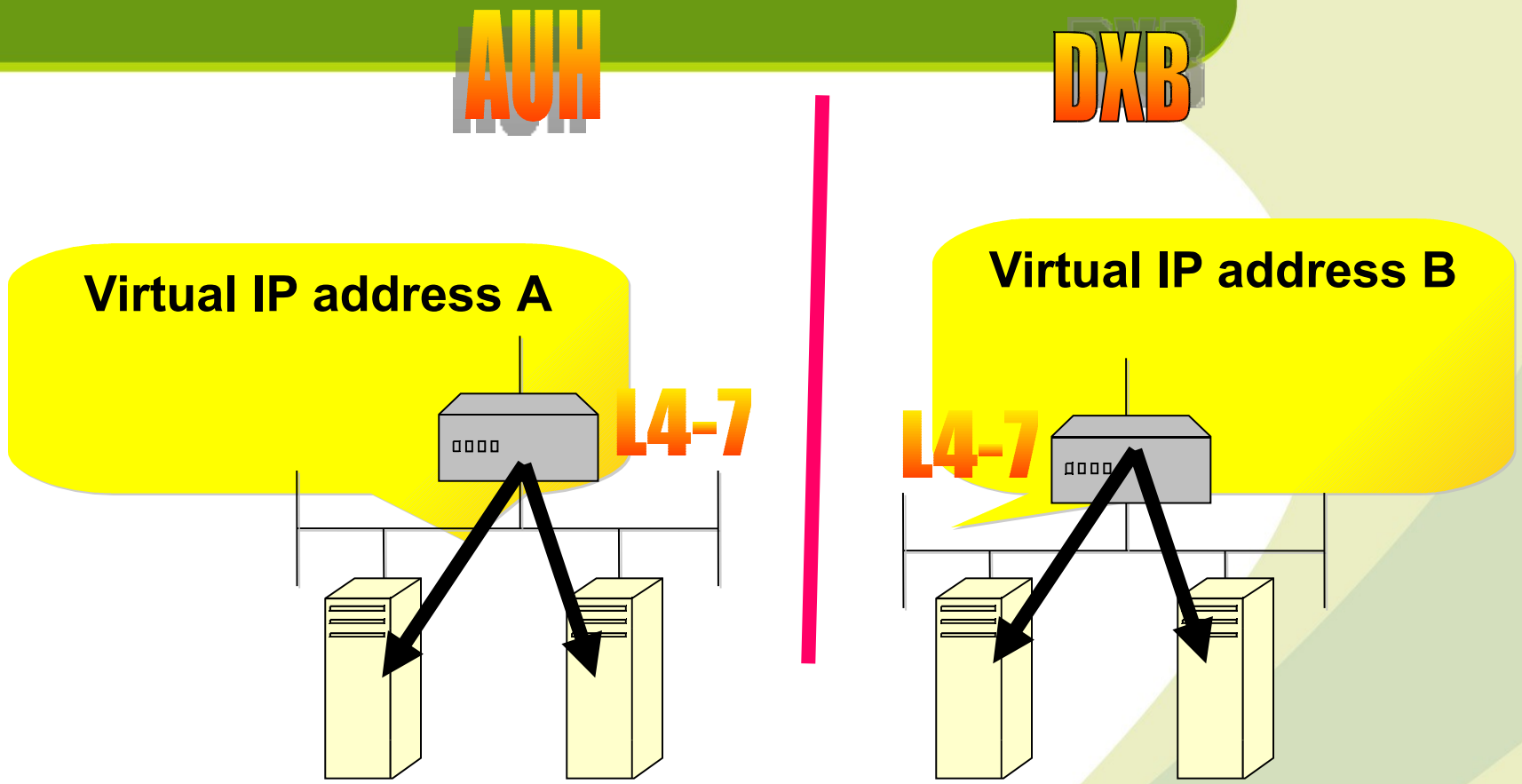
Kaminsky upgrade

- Major Performance impact with on resources
- Still Awaiting more optimized ISC release

Future Plans

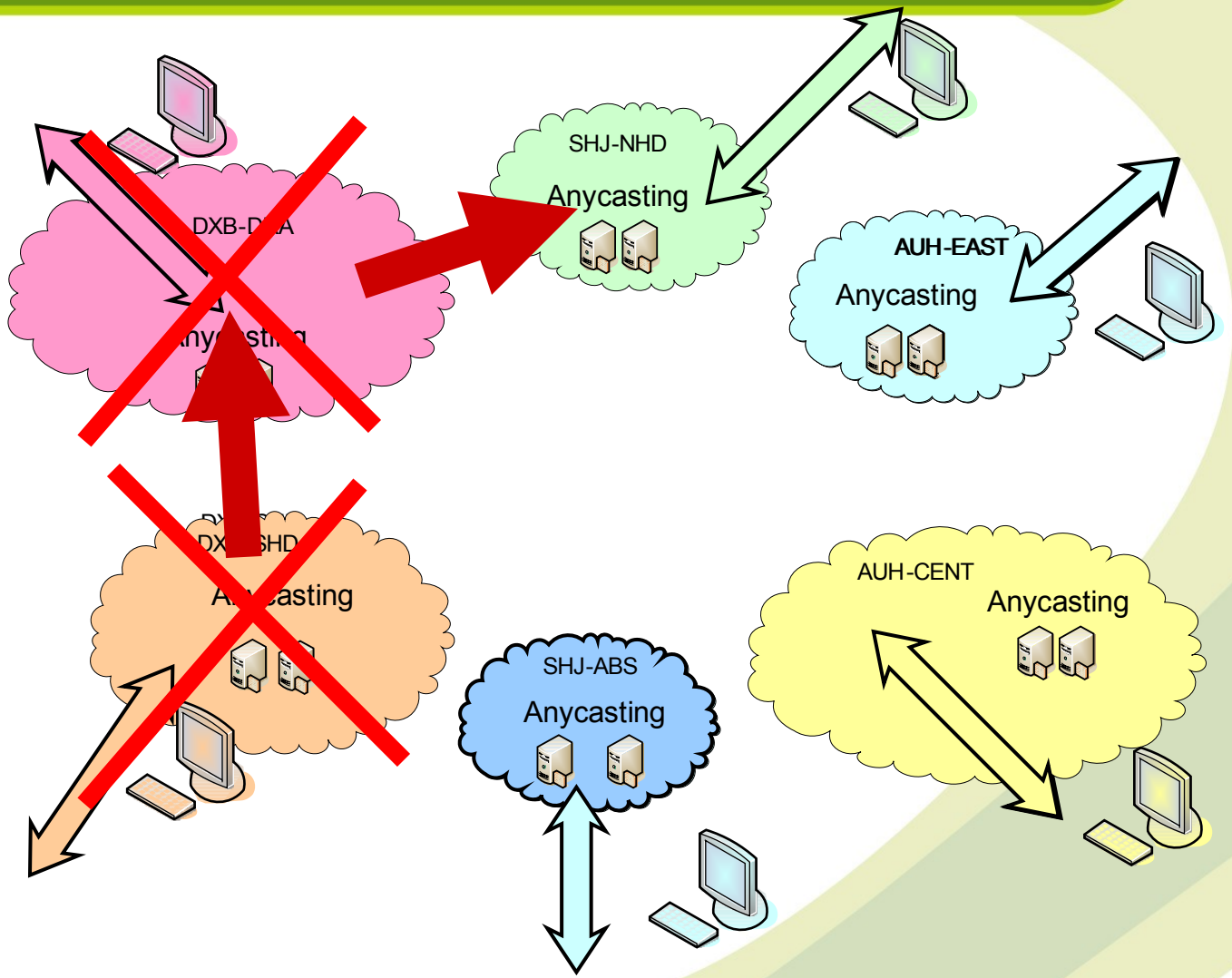
- Distributed Caching Name Service
  - Distributed CNS to different locations
- Distributed Authoritative Name Service
  - Largely distribute ANS to different geographical locations
- IPv6 Ankabut project
  - DNS service for IPv6 project Ankhabut

Distributed CNS-Today

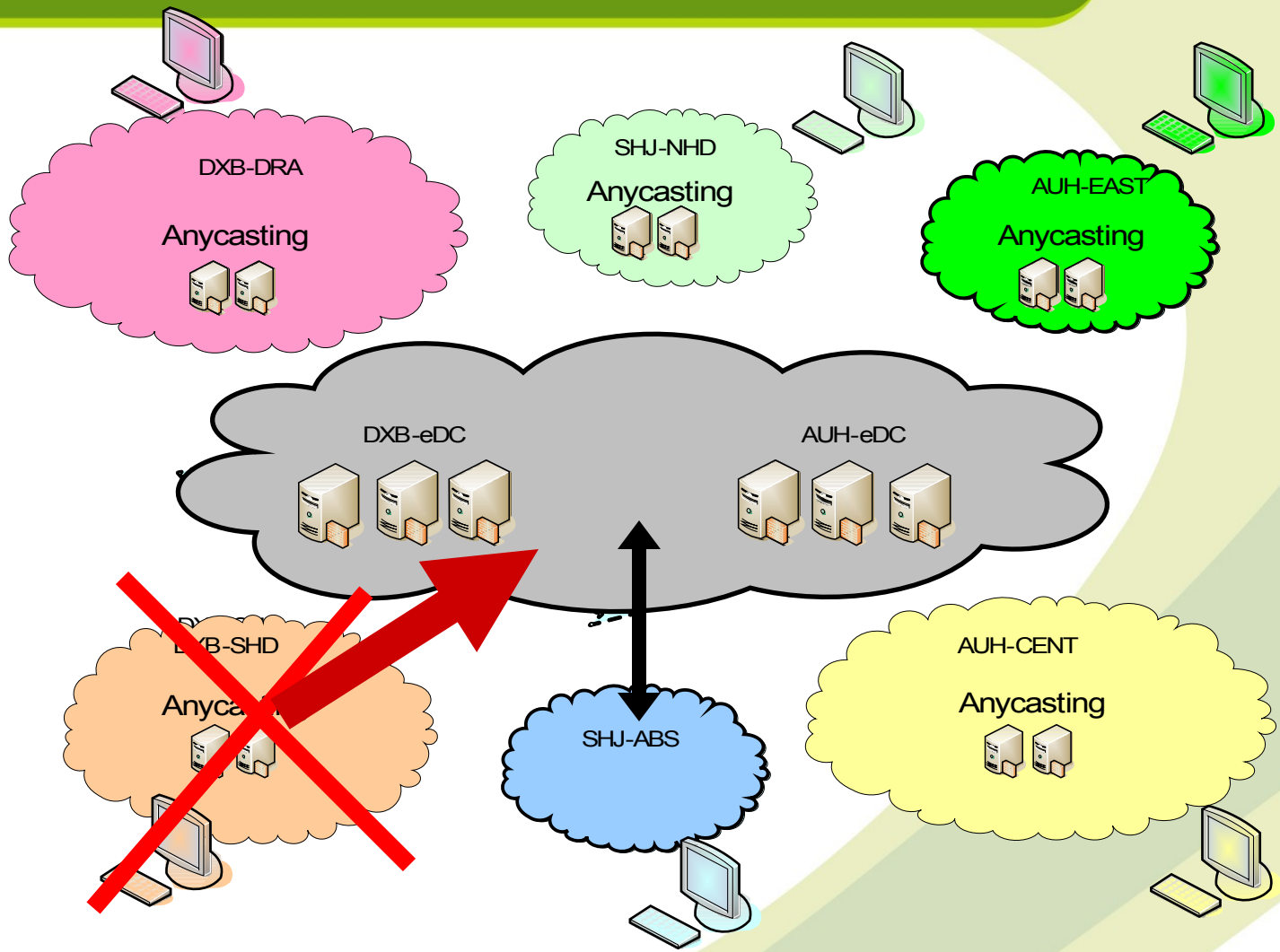


Today, centralized setup for Public Caching Services using L4-7 technology (2 DataCentres) – around 16500req/sec total

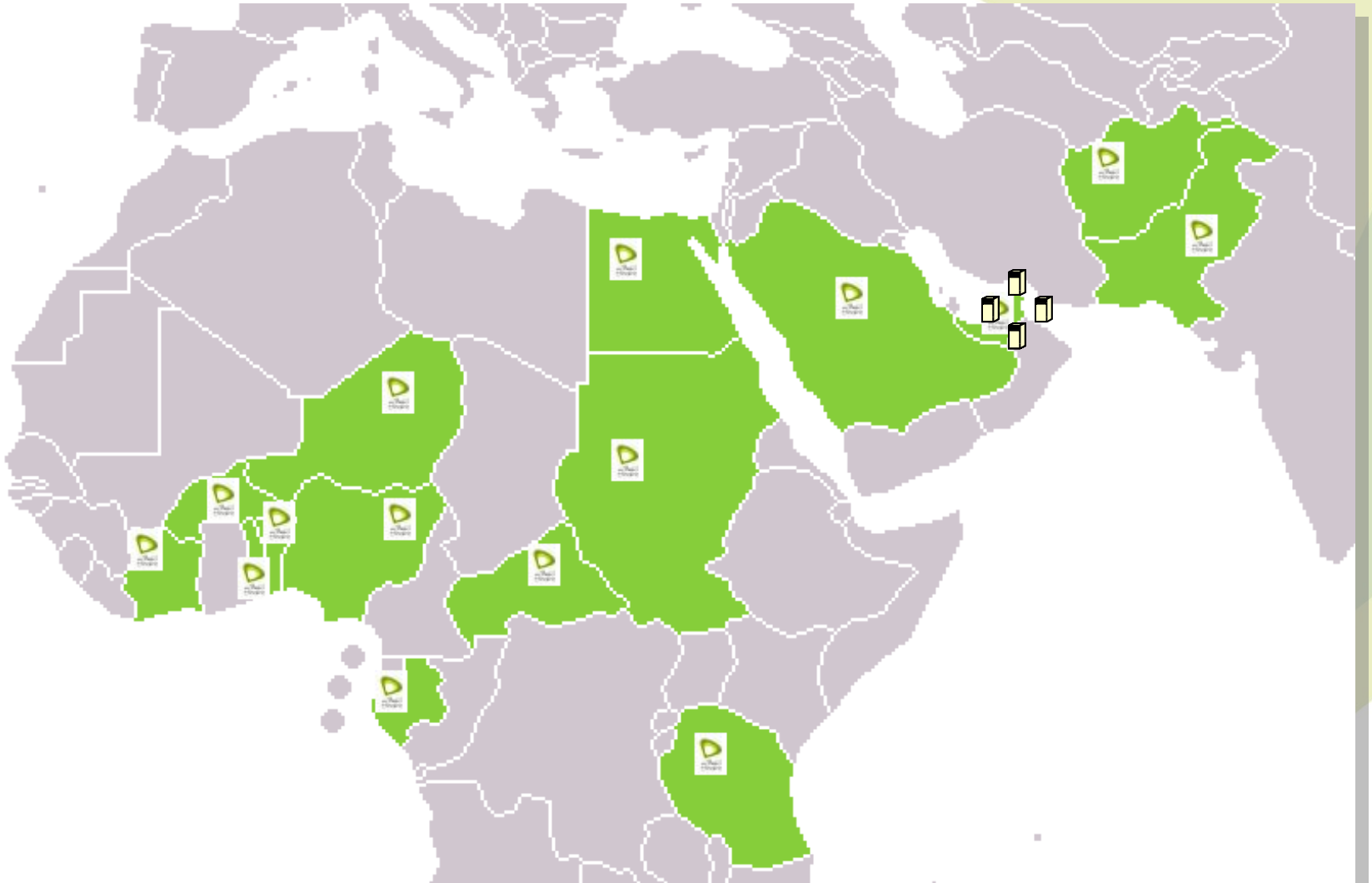
Small Anycast Clusters



Combination of L4-7 and Anycasting

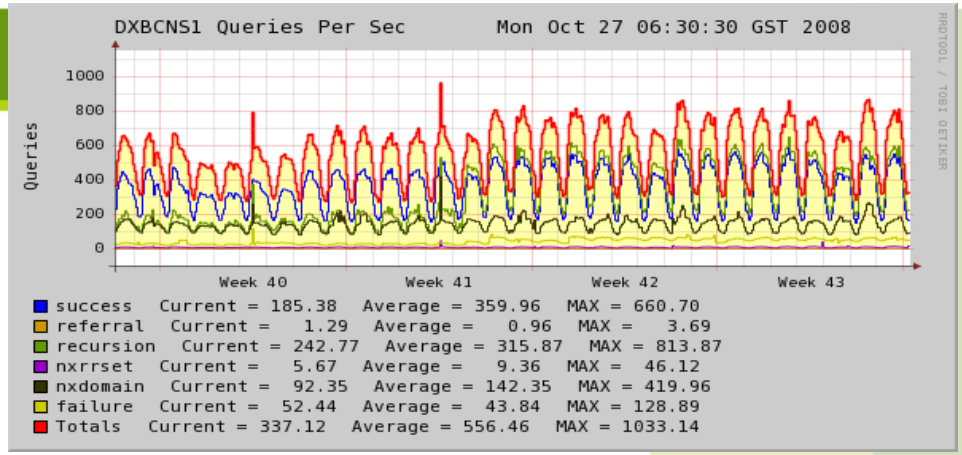


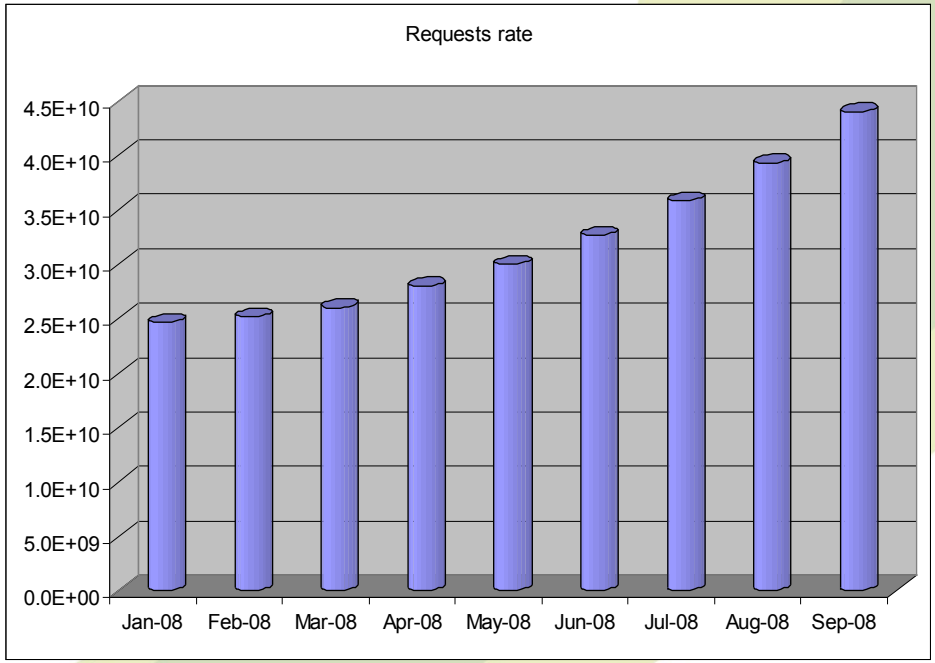
Distributed Authoritative Naming Service



Traffic Numbers

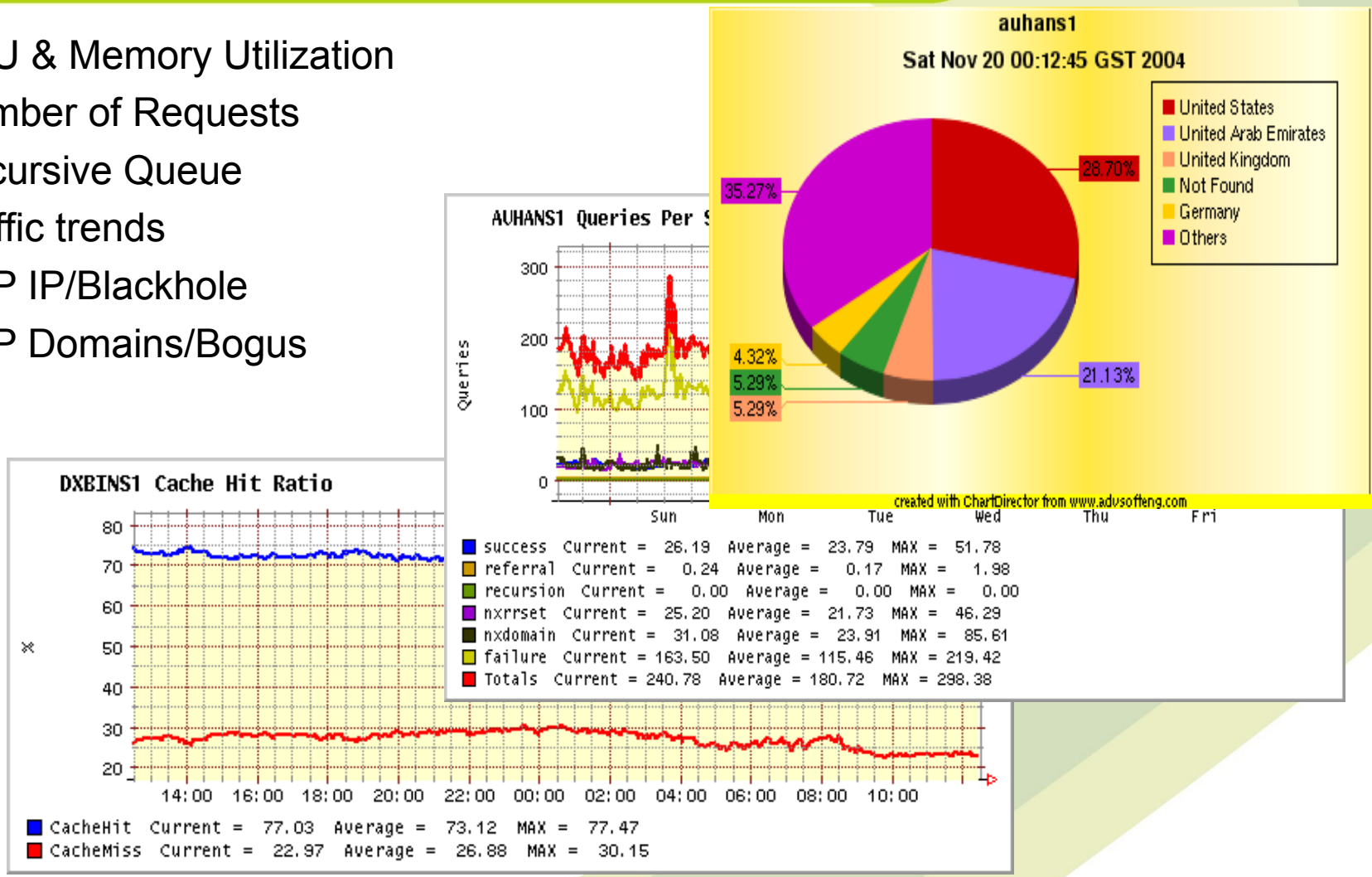
- 45 BIND instances running (for different groups)
- Approximately 33% of traffic increased since previous month
- Requests per sec in public caching service
  - Max. 17,800 req/sec
  - Avg. 11,200 req/sec





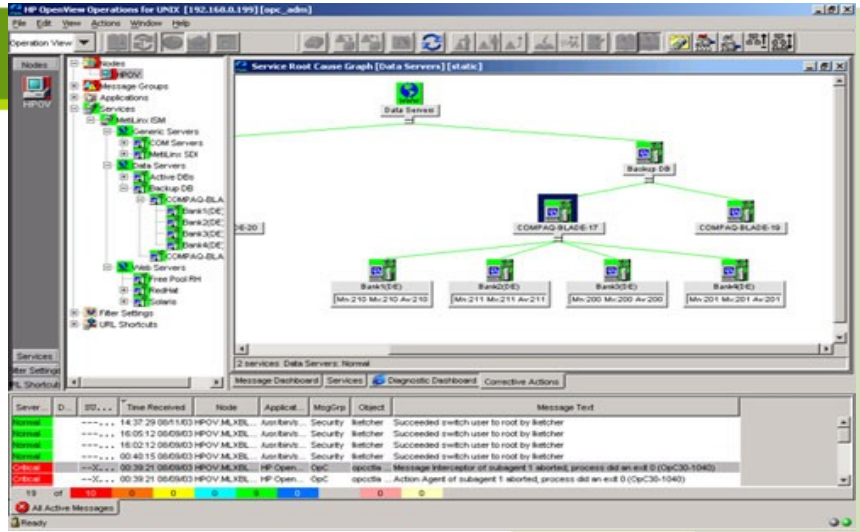
Things to Monitor

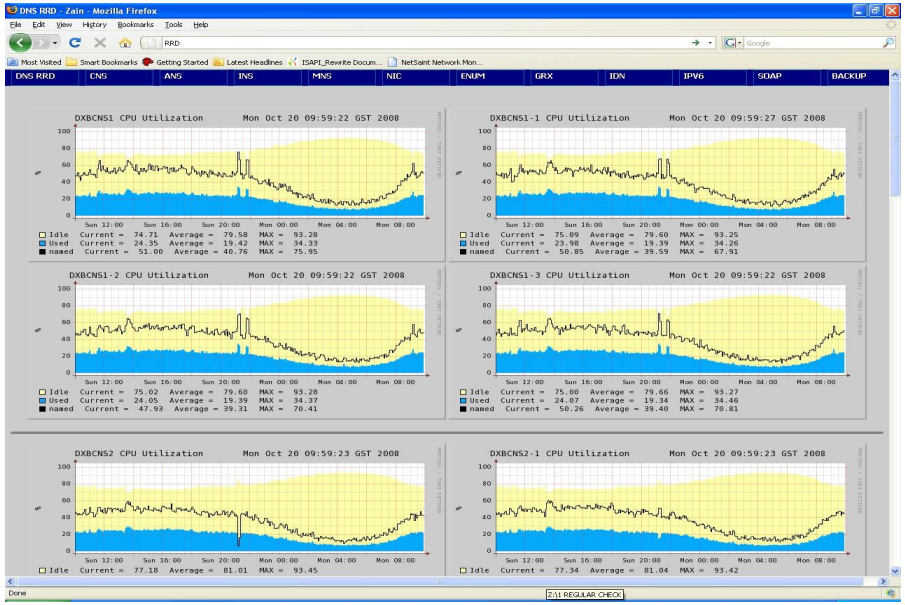
- CPU & Memory Utilization
- Number of Requests
- Recursive Queue
- Traffic trends
- TOP IP/Blackhole
- TOP Domains/Bogus

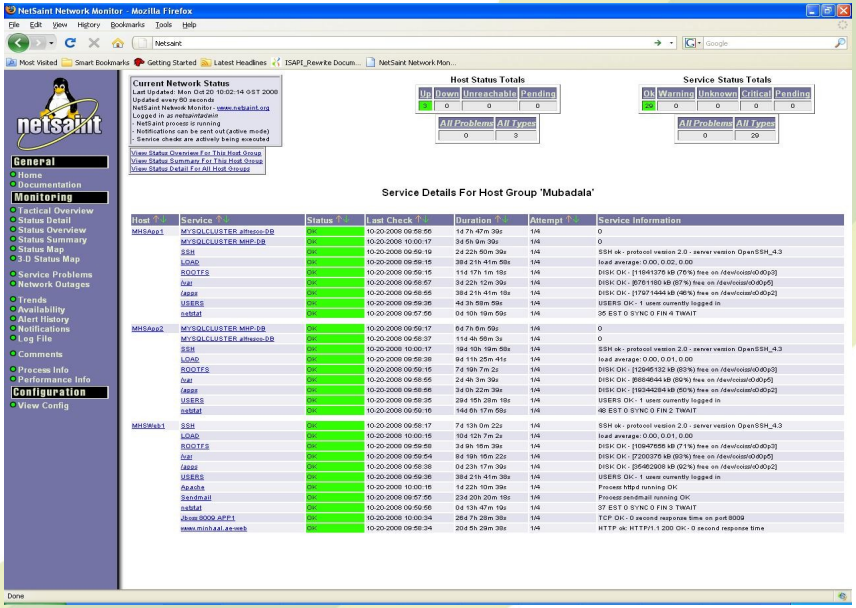


Tools used

- HP OpenView
- MRTG
  - Newer Version is RRD
- Netsaint
  - Newer Version is Nagios







Points learned

- Separate geographically
- Separate the functionality
- Separate Access
- Keep latest sw versions
- Use well defined SOA, TTL
- Use consistent & uptodate NS records (parent & child)
- Restrict Zone Transfers
- Monitoring / Logging
- Combine different technologies
- Plan well in advance, not under stress