Anycast Solution

Security through Diversity™
About Afilias

- Afilias Limited is a leading provider of advanced domain name registry services and currently supports over 13,000,000 registrations

- Afilias Offices:
  - Headquarters in Dublin, Ireland
  - Sales offices in London, England
  - Operational facilities in Toronto, CA
  - Admin. offices Philadelphia, USA
  - Operational offices in New Delhi, IN

- Founded in 2000
- Irish-based entity
- Privately held
- 13 million domain supported
  - 2 generic Top Level Domains (gTLD’s)
    - .ORG and .INFO
  - 3 Sponsored TLD (sTLD’s)
    - .mobi, .asia, .aero
  - 9 country code TLD’s (ccTLD’s)
What is Anycast?

- Anycast addressing is simply assigning a common IP address to multiple instances of the same service.
- Provides redundancy and load sharing to specific types of network services on the Internet.
- Utilizes routing infrastructure of the Internet, IP packets are forwarded to the nearest instance of the anycast service.
- Usually, one node receives each packet.
- The node that receives a specific packet is determined by routing.

**Anycast**

- Leverages existing infrastructure of the Internet.
- Does not negatively effect existing networks.
- Routers, clients and servers require no special software.
The Afilias difference

- Since 2001, Afilias has delivered 100% uptime of its name servers
  - See www.icann.org for our record
- Afilias operates on a distributed basis for security and stability
- Operates in many locations around the world, with 5 major “hub” sites
  - Also distributed to dozens of “pod” sites around the world
- Diverse hardware, and software simultaneously operating in Anycast and Unicast for the

Maximum in security and stability.

No single site is considered “primary,” since all sites are updated in near real time from the registry database
Afilias DNS Architecture

### Diversity at all levels
- Multiple DNS providers
- Bandwidth providers with a minimum of 1 gbps
- Geographically diverse datacenters
  - in 20 locations worldwide
- Cisco and Juniper Routers
- Multiple firewall and load balancer providers
- Servers with varied architecture
- Bind 9.5 and NSD (NLnet Labs)
- 3 network monitoring tools
Afilias TLDs under management
Afilias DNS network
Afilias TLD + DNS coverage
## Afilias DNS coverage by location

<table>
<thead>
<tr>
<th>Location</th>
<th>Afilias Hubs</th>
<th>Secondary Pods *</th>
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<tbody>
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* Secondary pods are provided through our extended DNS network
Resiliency + Resistance to Attack

- Zone data received by multiple Distribution Masters sending data to multiple name servers
- 2 DNS Distribution Masters located in each Afilias Hub
  - each acting autonomously
- Network access for each Distribution Master provided by a pair of management routers
  - each connected to a different transit provider
- Geographic separation affords even further protection against cyberstorms, as well as real storms
- Each Afilias Distribution Master can receive zone updates from every other Distribution Master + the DNS Distributor
Data Center Overview

- Afilias operates in data centers engineered to eliminate any single point of failure, with multiple layers of redundancy
- Two different power substations
- Dual entry on different sides of the building
- Automatic throw-over switches
- Multiple diesel generators and guaranteed fuel supply
- Halon and water suppression technology
- Multiple air conditioning units configured in a fully redundant array
- Multiple UPS power units with battery backup to provide electrical power
- Redundant Internet connectivity from diverse vendors
- High-level Service Level Agreements (SLA)
System Monitoring Tools

- Afilias utilizes three different systems to monitor each component for security, performance and stability both from within the data center, and from our redundant Network Operations Centers (NOC).

- All NOC sites are manned 24/7/365.

- This allows the earliest possible warning of trouble, in order to allow ample preparation in case of a detected fault.
Backup

- The “master location” for creation of DNS zones is securely stored within the registry systems.
- Each Afilias DNS node has a current “hot” copy of the zone, which can be retrieved at any time.
- In the event of an entire registry system failure, the Afilias DNS infrastructure would continue to answer DNS queries without performance degradation.
- If an individual name server cluster should somehow corrupt a zone, that node can immediately be taken out of service without causing system interruption.

All DNS nodes have “hot” copies of the zone

Globally distributed “hubs” and “pods”

Clusters can be taken down independently without any impact on the overall system.
Excellence in DNS

- Accelerated time from insert to last leaf node
- Global network
- High capacity
- Anycast

Stability
- 100% guaranteed resolution
- Resilient to attacks
  - Global network
  - High capacity
  - Anycast

Speed

Diversity
- Application BIND & Non-BIND
- Hardware
- DNS Providers

Transparency
- Graphical analysis
- Near real-time reporting

Security
- Attack mitigation
- Disarming botnets
- Early notification

Afilias

GLOBAL REGISTRY SERVICES
Questions?

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