

A horizontal banner with a dark blue background. On the left, there is a glowing blue globe. To its right, white lines representing data or network connections flow across the banner. The text "The future of DNS Security" is written in large, white, sans-serif font across the center.

The future of DNS Security



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The future of DNS security

- DNS is the technology that underpins the development and functionality of the Internet
- Since DNS was developed, the use and effect of the Internet has fundamentally shifted
 - The Internet is now mission critical to EVERYONE and ALL communications

Future looking:

DNS and DNS networks need to be based on:

1. a stable, reliable security model to thwart criminal attacks
2. a diverse, scalable network with no single points of failure



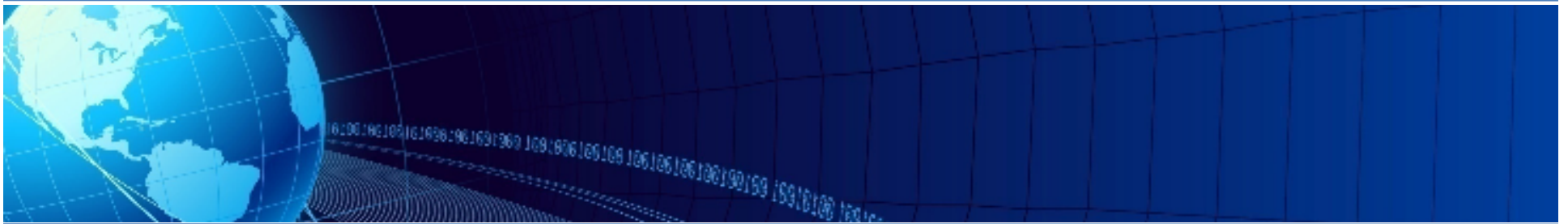
Will the DNS and the root be stable?

Several deployments:

- IPv6 (and IPv4 depletion)
- New TLDs
- IDN TLDs (iTLDs)
- DNSSEC deployment



Not a technical scaling question alone



***Creating a stable, reliable security model
to thwart criminal attacks...***





DNSSEC: A new security model for DNS

- DNS Security Extensions (DNSSEC)
 - Best way to protect from a man-in-the-middle attacks and cache poisoning (a.k.a. “the Kaminsky bug”)
- DNSSEC introduces digital signatures to the DNS infrastructure, allowing end users to more securely navigate the Internet.
- Provides effective verification that applications, such as Web or email, are using the correct addresses for servers they want to reach.

Current state of implementation

- .ORG signed by Afiliias, on behalf of PIR, June 2
 - The .ORG key was pushed to the Interim Trust Anchor Repository (ITAR) on June 26, 2009 and picked up by the DNSSEC Look-Aside Validation (DLV) on July 6, 2009.
 - 18 domains successfully signed in the Friends & Family phase
 - The first scheduled Zone Signing Key (ZSK) rollover was successfully completed on July 2, 2009.
- 12-14 other TLDs are also signed; Root to be signed by end of 2009; .COM expected 2011

SANOG.org is signed!!!

What's the tipping point for DNSEC adoption?

Stagnation

Adoption

Complexity

TLDs being signed
(.org, .gov)

Costs

Testbed
deployments

Unsigned Root

New hardware &
software solutions

Getting DNSSEC to the mainstream

What are the problems with getting to mass adoption?

- Not enough early adopters
- Complex to implement
- Root not signed
- Partial deployment worries
- Cost to deploy vs. benefit

No man's Land

This is the problem we need to address!

R&D

Pioneers

Early
Adopters

Mass
Adoption

Mainstream



Choices to adopt DNSSEC

- Option 1: Do it yourself requires:
 - Hardware and software costs
 - Overcome complexities of key distribution
 - In-house expertise, typically not mission critical
 - Risks of website being inaccessible , if done incorrectly

If a site owner selects this they will have to manage:

- New DNSSEC software
- New DNSSEC hardware
- Generating keys – KSKs, ZSKs
- Loading keys for each zone
- Generating and storing DS records at the registrar
- Key rollover

This is NOT a core business function for most organizations!



Choices to adopt DNSSEC

- Option 2: Outsource
 - Fixed cost
 - No expertise needed
 - Complete end- to-end solution

Requires:

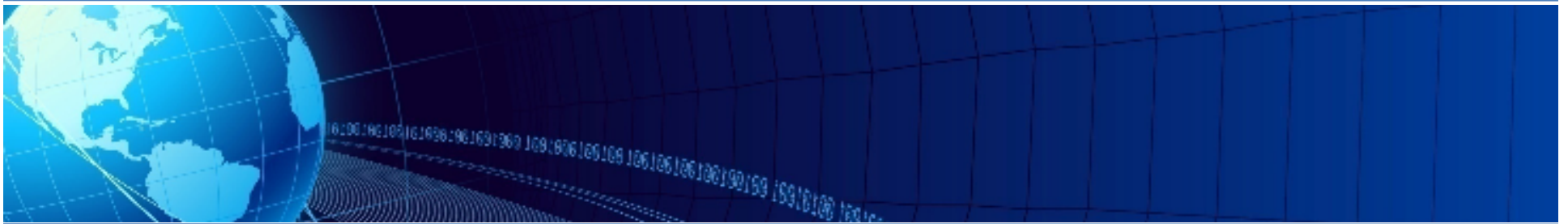
- Known provider with global DNS infrastructure and experience in DNSSEC
- Simple interface for signing and management
- Relationships with Trust Anchors and DNSSEC industry leaders
- Service Level Agreement and Contract

Need for an easy solution

To get DNSSEC to the mainstream DNSSEC needs to be made easy with managed services and deployment down the chain of trust

- Afilias beta testing **1-Click DNSSEC™**
 - Security of DNSSEC and the convenience of effortless management, in one solution.
- Opportunity for new DNSSEC products to
 - Securing Email
 - E-Commerce applications
 - RFID networks, etc.





***A future where all domains and all content
is in your local language...***



Your mailbox in Chinese

歡迎, 伊昭傑



家(M)



版面配置(Y)



選項(O)



問題



說明



登出(L)

上一次登入: 西元2007年09月20日 (週四) 14時51分46秒 自
idn-test.int.libertyrms.com

- 郵件商務
- 郵件 (5)
 - 過濾器
 - 寫信
 - 搜尋
 - 收件匣 (5)
 - 虛擬信件匣
 - sent-mail
- 組織
- 選項
- 登出

郵件 寫信

收件匣 5

過濾器

- 友善名單 啟用
- 黑名單 啟用

備忘錄 新增摘要

無摘要可供顯示

行事曆 新事件

無事件可供顯示

待辦事項 新增

沒有待辦事項。

連絡人搜尋

快速搜尋

搜尋

Done



How Do You Know Who Is Writing To You?

- Internet applications must handle messages in multiple languages

收件匣 (5) 第 2 頁共 2 頁

選擇: 標記成: 撤移 | 複製 郵件到

刪除(D) | 復原已刪除(U) | 黑名單(B) | 友善名單(W) | 轉寄 | 檢視

| | 編號 | 日期 | 寄件人(M) | 主旨(I) [關聯(T)] |
|--|----|---------------|--------------------------|--|
| | 21 | 西元2007年09月04日 | jyee@idna.info | idna convert |
| | 22 | 西元2007年09月04日 | jyee@idna.info | ASDF Left to Right English |
| | 23 | 西元2007年09月07日 | jyee@idna.info | testing bcc |
| | 24 | 西元2007年09月10日 | Дерек Аликсандер Вилиамс | Blah |
| | 25 | 西元2007年09月10日 | Дерек Аликсандер Вилиамс | Hello again |
| | 26 | 西元2007年09月10日 | Дерек Аликсандер Вилиамс | Re: Hello again |
| | 27 | 西元2007年09月11日 | jyee@idna.info | as subject, address book test |
| | 28 | 西元2007年09月11日 | Дерек Аликсандер Вилиамс | Here is a list of contacts! |
| | 29 | 西元2007年09月11日 | jyee@idna.info | testing the new sent-mail folder |
| | 30 | 西元2007年09月11日 | Дерек Аликсандер Вилиамс | Address book update |
| | 31 | 西元2007年09月11日 | jyee@idna.info | utf8 domain test 4th |
| | 32 | 西元2007年09月12日 | राम@मोहन.ईन्फो | Testing addresses with home directories. |
| | 33 | 西元2007年09月13日 | Дерек Аликсандер Вилиамс | Re: Hi дерек |

What About Content?

Applications must handle content in multiple languages

Send Message Save Draft Cancel Message

Identity lbayles@idna.info (Default Identity)

To 伊昭傑 <伊昭傑@郵件.商務>

Cc

Bcc

Subject Re: subject in Chinese, 你好! It's Hello!

Charset Unicode (UTF-8)

Address Book Expand Names Special Characters Attachments

Save a copy in "sent-mail"
 Request a Read Receipt
[Switch to HTML composition](#)

Text Quoting 伊昭傑 <伊昭傑@郵件.商務>:
> 世界, 你好!
> Hello World!
>
> and Hello Len! Hello Derek!
>
> Joseph Yee
> 伊昭傑 (In Chinese, the first world is last name, western format is 昭傑, 伊)
>
> -----
> This message was sent using [Afilias Mail](#), a global mail program

Send Message Save Draft Cancel Message



***Designing a diverse, scalable network
with no single points of failure...***



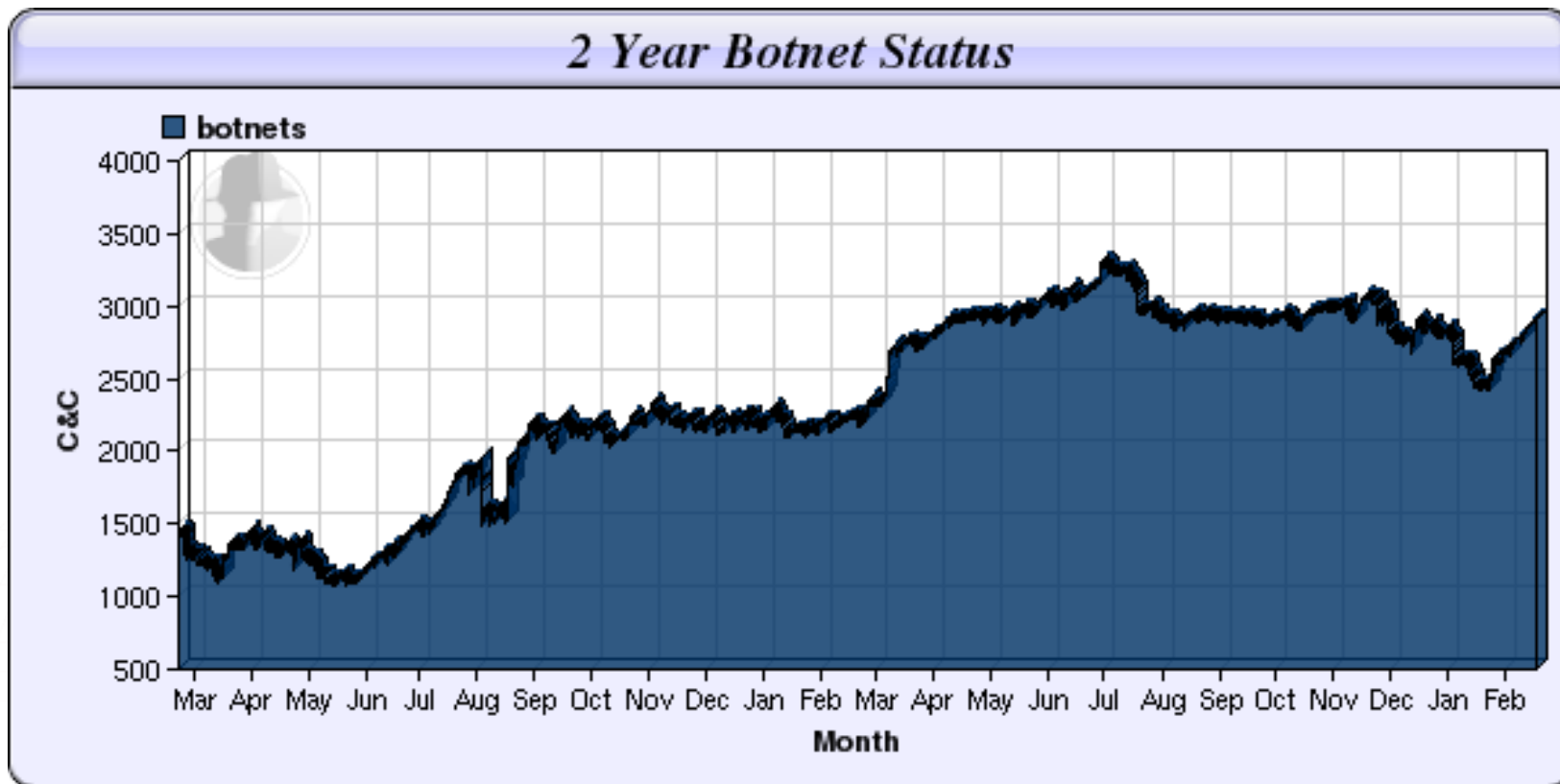


Why your DNS needs to worry

- It's not just companies being targeted anymore!
- The DNS is growing more and more susceptible to attack through
 - Continued and larger scale DDoS attacks aimed at the Root and TLD operators
 - Regionalized attacks focusing on countries or specific governments / government agencies
- DNS is being victimized by new malicious activity (e.g.: Worms like Conficker)
- Small DNS networks being tasked with heavy load from new services (e.g.: URL shortening)

Botnets are here to stay

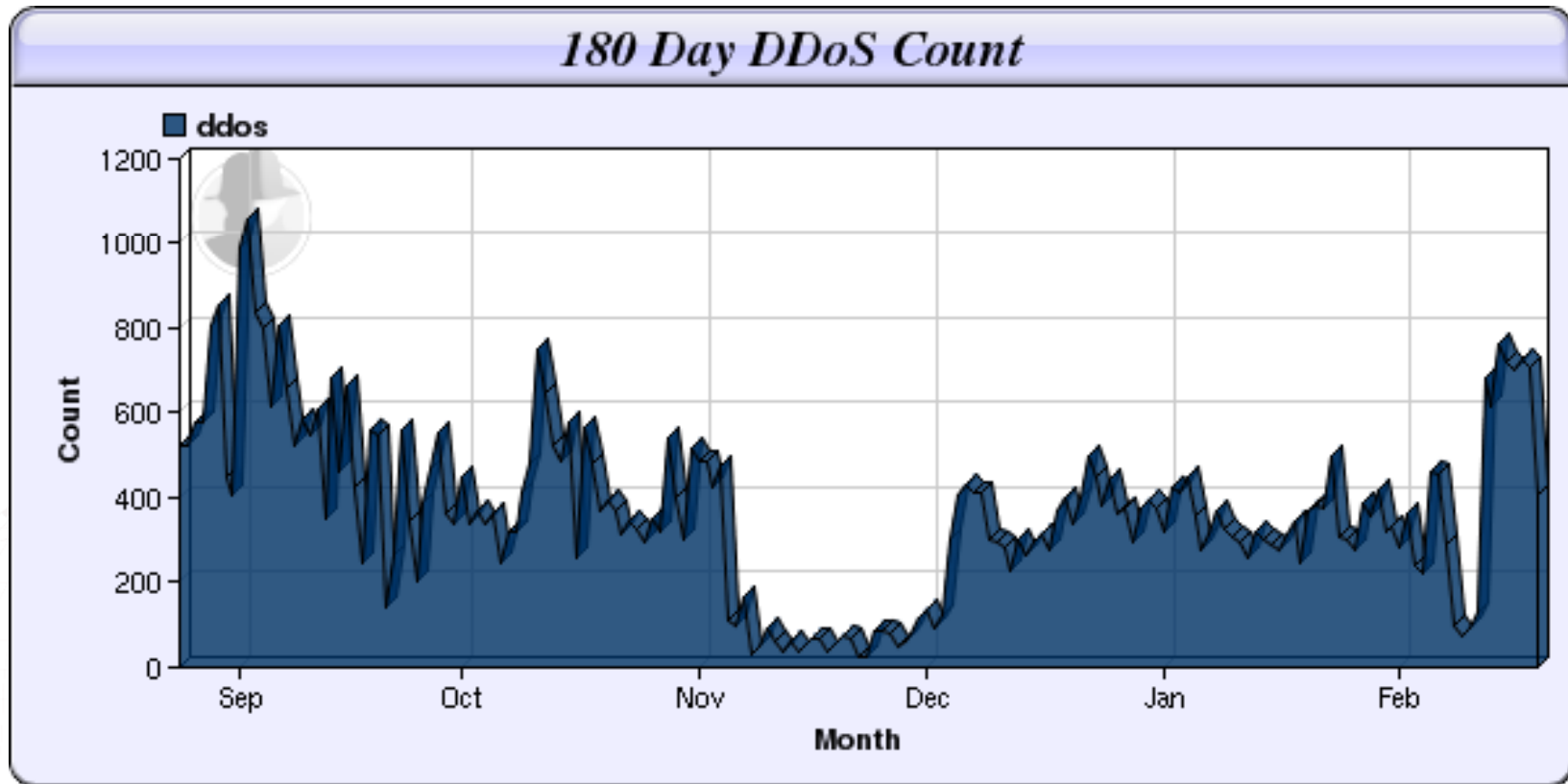
- Larger attacks, more sophistication



Source: <http://www.shadowserver.org>

DDoS Remains Serious Threat

- Increasing frequency and sustained activity



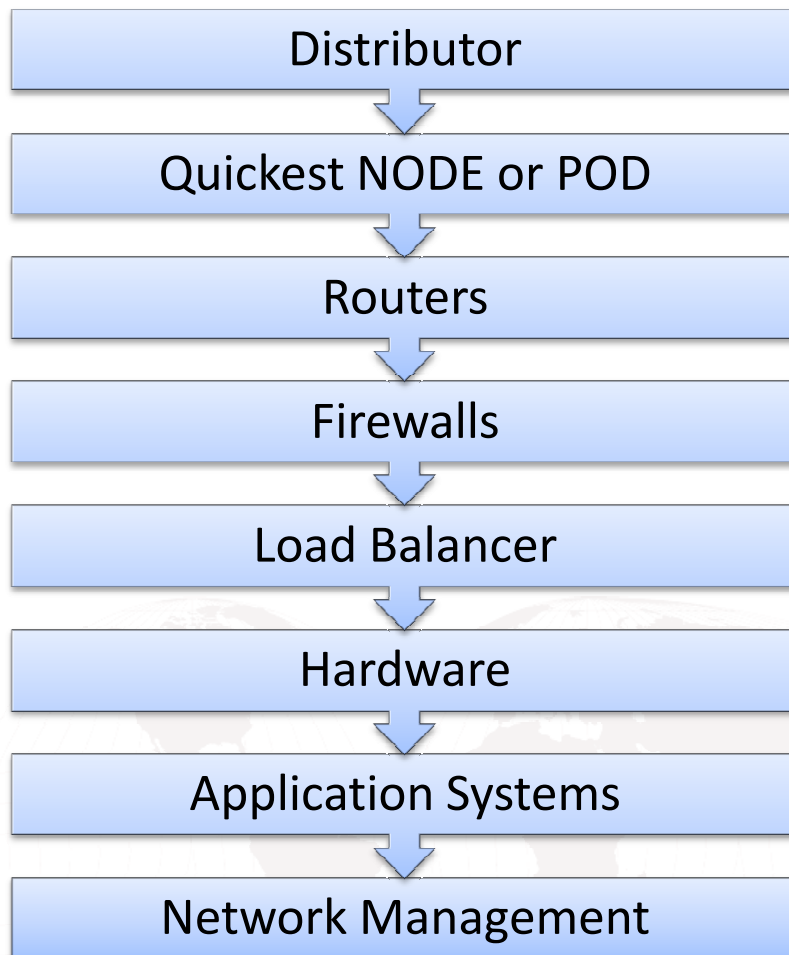
Source: <http://www.shadowserver.org>



Build your network with diversity

- No other Internet technology matters if users can not get to the Web site, or the e-mail can not be delivered.
- Treat your DNS like you do any other technology – **build it with redundancy, scalability and ensure no single points of failure**
- To deploy diversity across your DNS your options include:
 1. Internal development
 2. Adding an outsourced provider

Implementing DNS Diversity



Diversity at all levels

- Multiple DNS providers
- Multiple types of DNS software (e.g. : Bind + NSD)
- Geographically diverse datacenters and NOCs
- Geographically diverse DNS node constellation on multiple continents
- Nodes configured with Anycast technology
- Multiple bandwidth providers w/ min. 1 gbps
- Multiple brands of hardware (e.g: both Cisco and Juniper Routers)
- No single OS or other software
- Diversity in Personnel and expertise

Afilias DNS network



Americas (9)

- Atlanta
- Boston
- Washington DC
- New York City
- Palo Alto
- Los Angeles
- Miami
- Seattle
- Toronto

Europe (4)

- Amsterdam
- Paris
- Frankfurt
- London

Asia (3)

- Hong Kong
- Tokyo
- Singapore

Africa (1)

- Cairo

Pacific (1)

- Sydney

Please note, this schematic does not represent all connectivity points on Afilias' network.

About Afilias

- World class domain name registry services
- Scale/Knowledge/Experience of 14 million+ registrations & 15 TLDs
- Global DNS network available to TLDs + Managed DNS for end users

Generic & Sponsored TLDs



Country Code TLDs





Thank you!

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