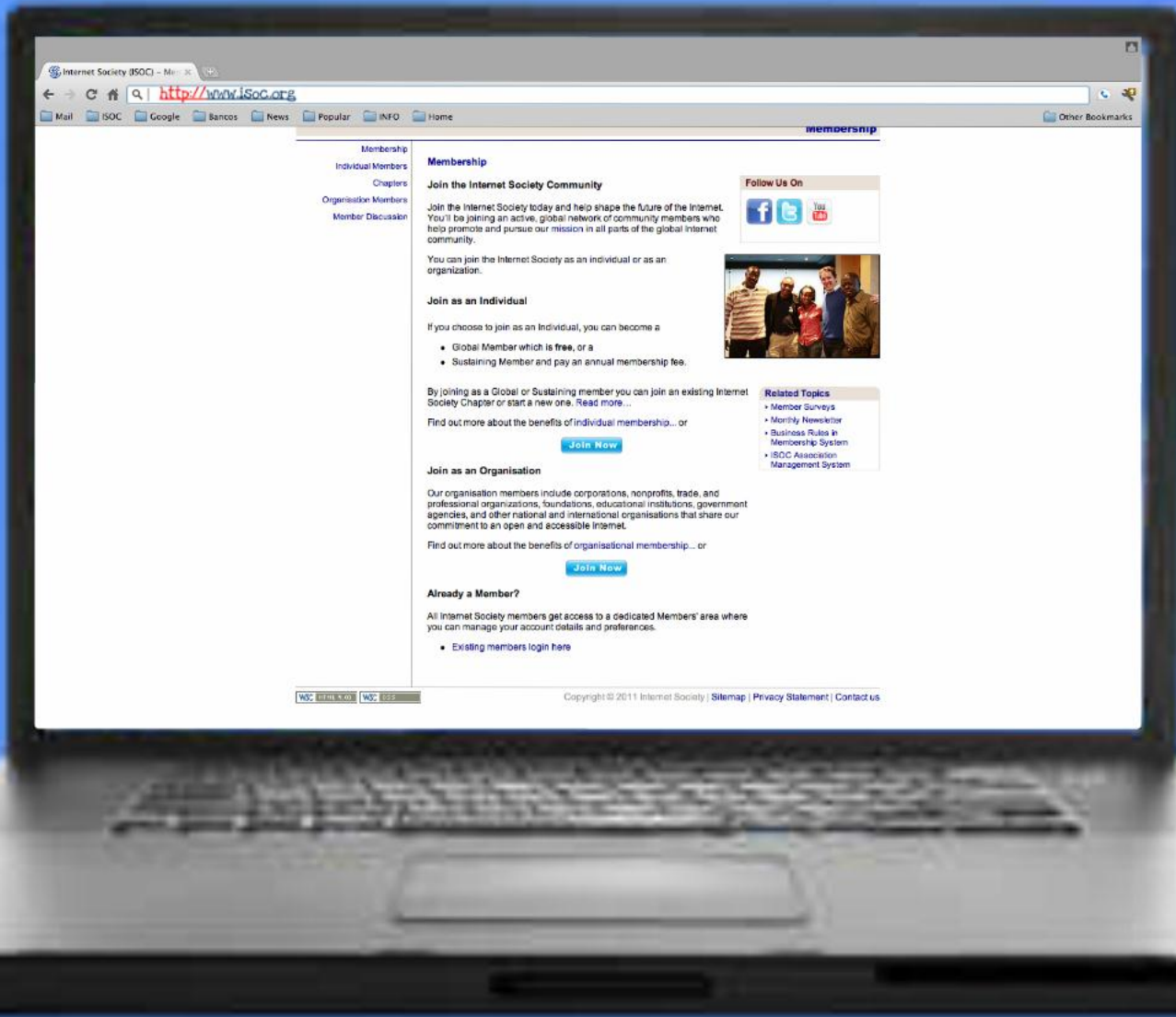


# Making the Internet Secure - Resilient - Trustable Technical Trends

CONFERENCE ON CYBER SECURITY - SEPTEMBER 2013 - JAMAICA  
Christian O'Flaherty - Internet Society - [oflaherty@iSoc.org](mailto:oflaherty@iSoc.org)





- Membership
- Individual Members
- Chapters
- Organisational Members
- Member Discussion

membership

**Membership**

**Join the Internet Society Community**

Join the Internet Society today and help shape the future of the Internet. You'll be joining an active, global network of community members who help promote and pursue our mission in all parts of the global Internet community.

You can join the Internet Society as an individual or as an organization.

**Join as an Individual**

If you choose to join as an Individual, you can become a

- Global Member which is free, or a
- Sustaining Member and pay an annual membership fee.

By joining as a Global or Sustaining member you can join an existing Internet Society Chapter or start a new one. [Read more...](#)

Find out more about the benefits of individual membership... or

[Join Now](#)

**Join as an Organisation**

Our organisation members include corporations, nonprofits, trade, and professional organizations, foundations, educational institutions, government agencies, and other national and international organisations that share our commitment to an open and accessible Internet.

Find out more about the benefits of organisational membership... or

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C) - Men ✕



http://www.iSoc.org

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News



www.iSoC.org?

DNS

query



Response 👍

IPv4: 212.110.167.157

IPv6: 2001:41c8:20::19





# Root



Support this site





signed information



# org

Independent from ISO

 ISOC.ORG

 Applied Information

# iSoc

 Applied Information

[www.iSoc.org](http://www.iSoc.org) N A 212.110.16.71357  
[www.iSoc.org](http://www.iSoc.org) N AAAA 2001:7168:20:11





# isoc



Signed information

www.isoc.org IN A 212.110.167.157

www.isoc.org IN AAAA 2001:41c8:20::19





13 Organizations running root Servers  
13 IP addresses in every recursive Server  
Hundreds of Servers Spread around the world





**Legend**  
 99 Multiple instances  
 K Single instance

Map data ©2013 MapLink - [Terms of Use](#)

Root zone - Public Information published by IANA

ccTLD: Country Code Top Level Domains ~ 118  
Million domains

gTLD: Generic Top Level Domain ~ 145 Million  
domains

sTLD: Sponsored Top Level Domains ~ 1,3 Million  
Run by ICANN, Registries, Governments,  
Universities and Companies



Aut

IPv4 Header			
Version	HL	Type of Service	Total Length
Identification		Flags	Fragment Offset
Time to Live	Protocol	Header Checksum	
Source Address			
Destination Address			
Checksum		Options	

IPv6 Header		
Version	Traffic Class	Flow Label
Payload Length		Next Header
Source Address		
Destination Address		





### IPv4 Header

Version	IHL	Type of Service	Total Length	
Identification			Flags	Fragment Offset
Time to Live		Protocol	Header Checksum	
Source Address				
Destination Address				
Options			Padding	

### IPv6 Header

Version	Traffic Class	Flow Label		
Payload Length		Next Header	Hop Limit	
Source Address				
Destination Address				





BGP Interconnection AS 100 - AS 86

BGP Interconnection AS 100 - AS 86 \$ Transit \$

ISP

IGP

ASN 86

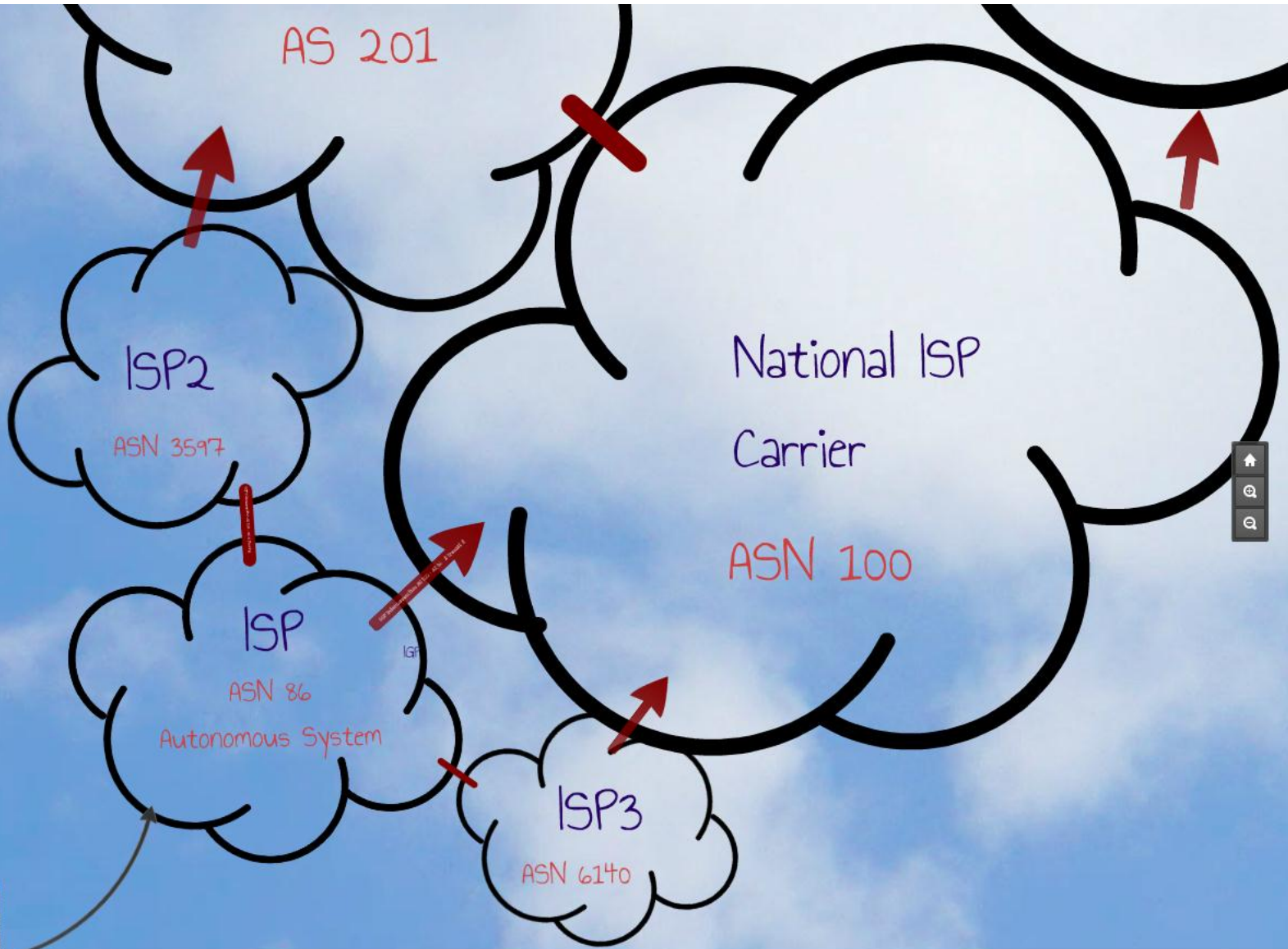
Autonomous System



AS 201



10.167.157  
+1c8:20::19



BGP Interconexión AS 100 - AS 86 \$ Transit \$



# BGP Interconnection AS 3597 - AS 86 Peering





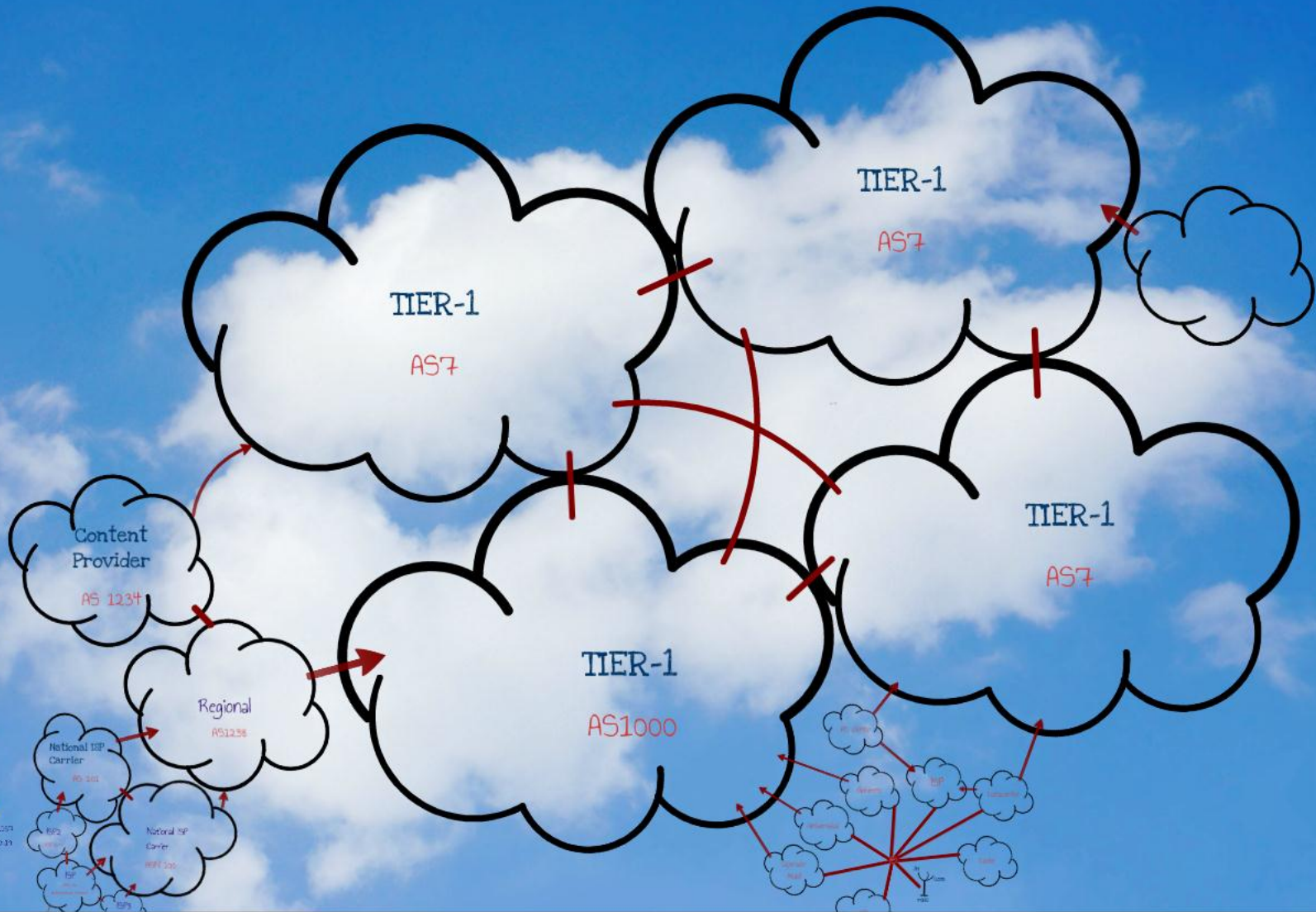


se  
2.110.167.157  
01:41c8:20:14





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Response  
P...  
DNE  
Soc.org?

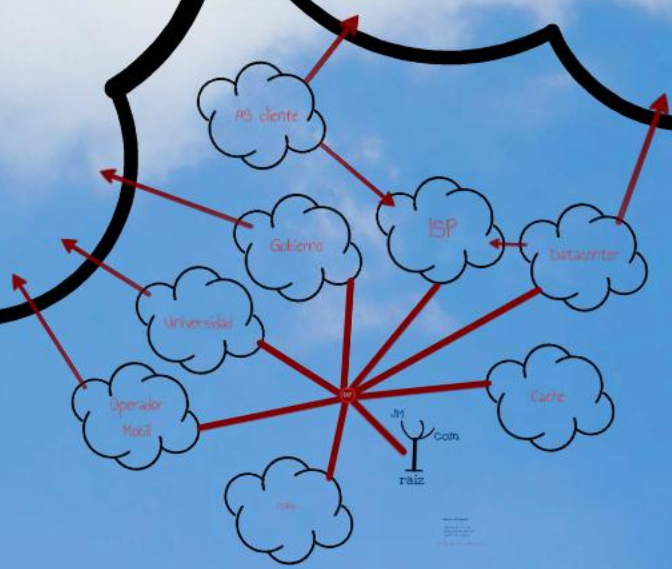


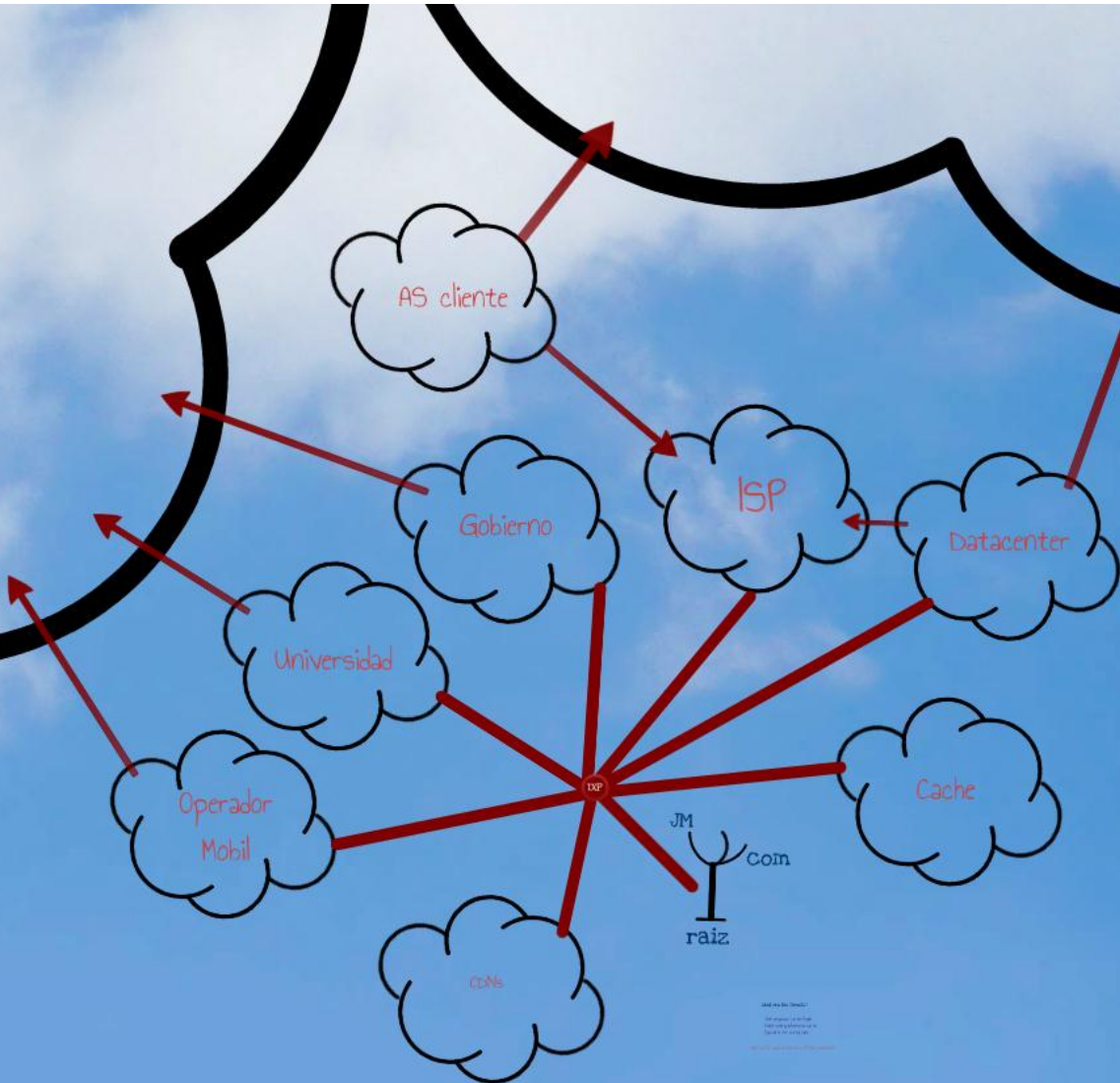
TIER-1

AS7

TIER-1

AS1000









What Are the Threats?

## what Are the Threats?

DNS responses can be forged  
Invalid routing information can be  
injected in the routing table





## What Are the Threats?

DNS responses can be forged

Invalid routing information can be injected in the routing table

User traffic could be sent to a different destination

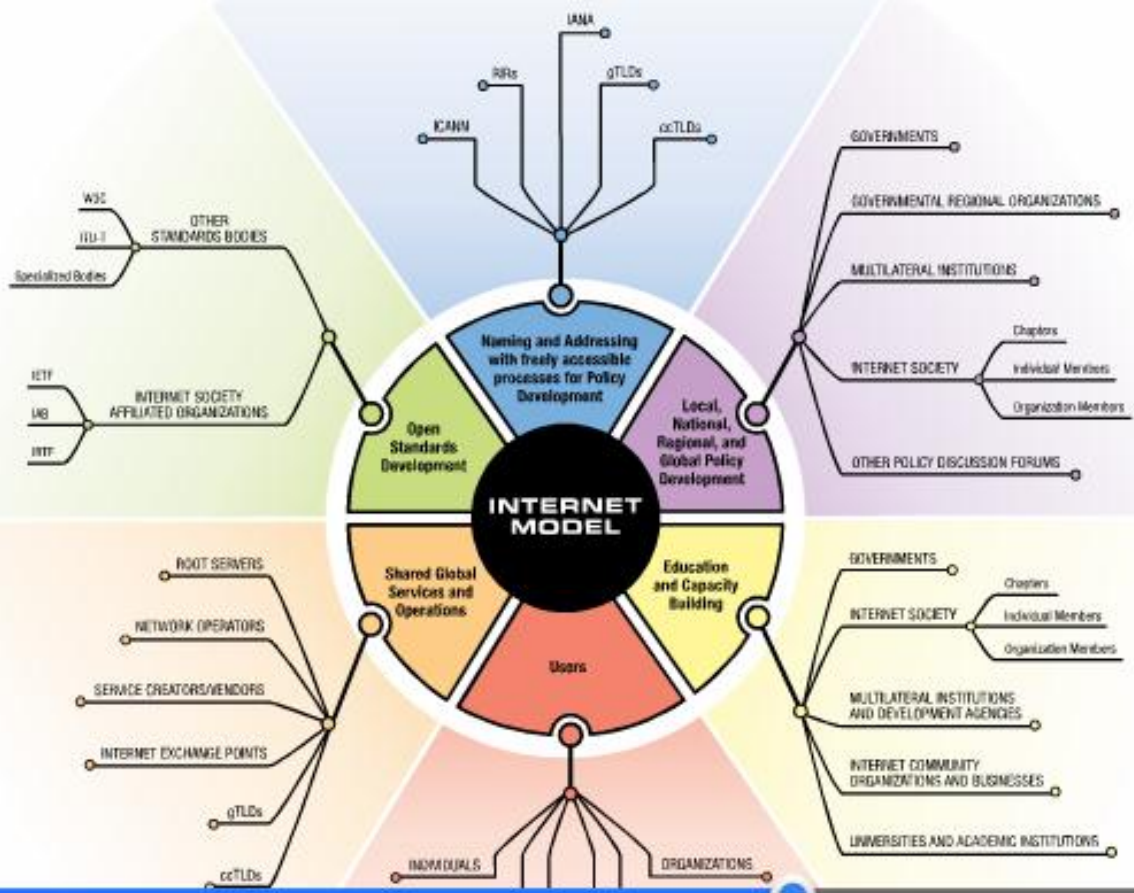






How does the  
"Internet Model"  
works in this case







Specialized Bodies

IETF

IAB

IRTF

INTERNET SOCIETY  
AFFILIATED ORGANIZATIONS

ROOT SERVERS

NETWORK OPERATORS

Open  
Standards  
Development

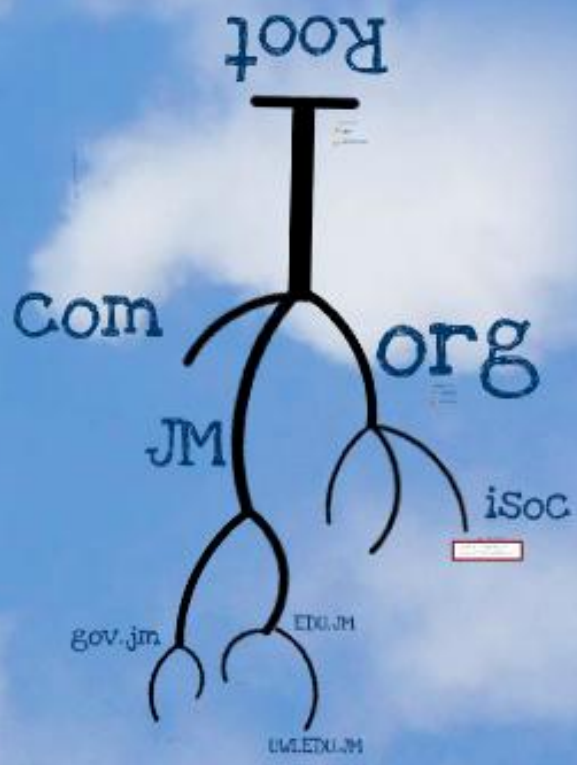
Shared Global  
Services and  
Operations

Naming and Address  
with freely accessi  
processes for Poli  
Development

**INTERNET  
MODEL**



DNS



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ReSponSe from ROOT

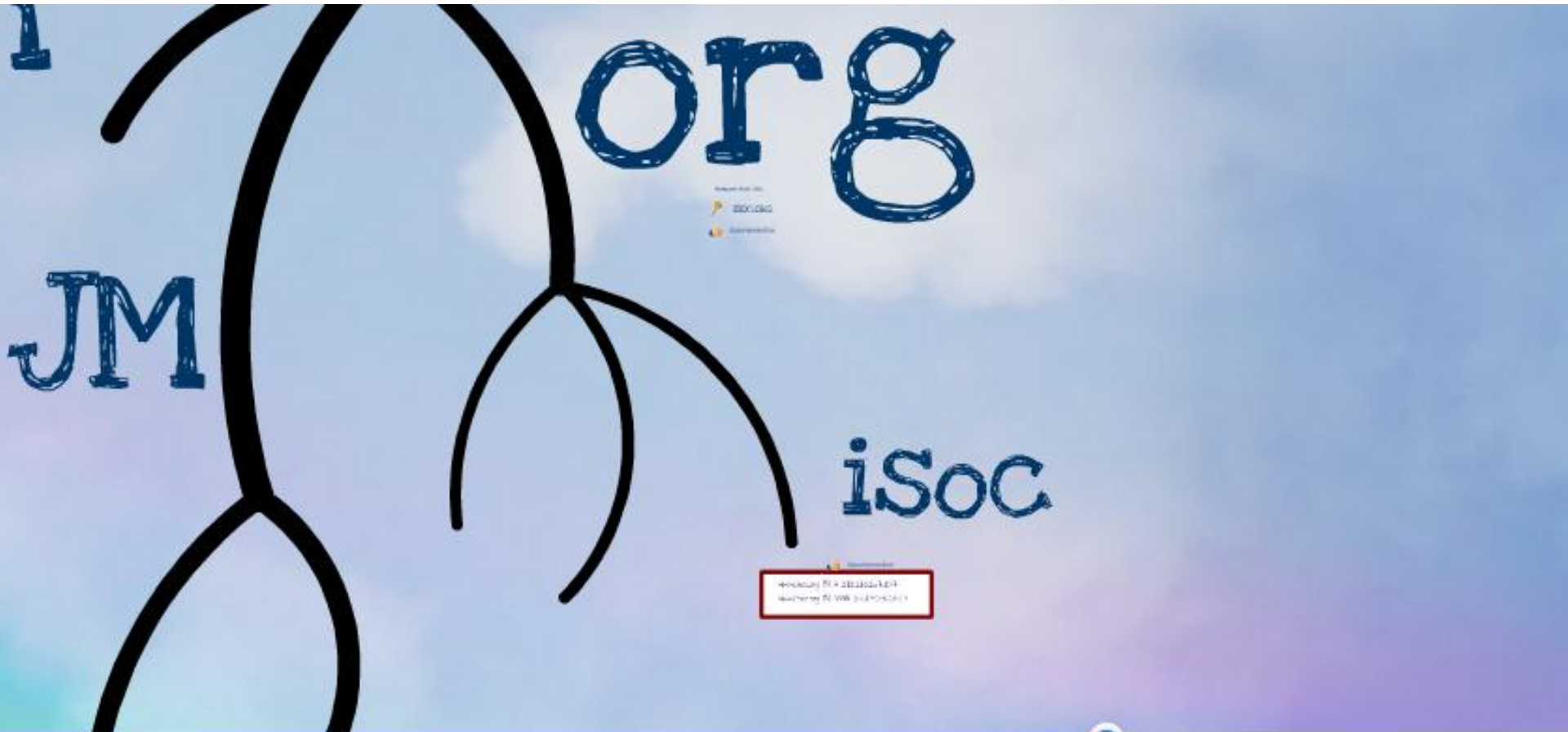


.org



signed information





org

Microsoft N 100 201004101  
Microsoft N 100 201004101

JM

iSoc

Microsoft N + 201004101  
Microsoft N 100 201004101



ReSponse from .ORG



ISOC.ORG




signed information







# iSoc

 signed information

www.isoc.org IN A 212.110.167.157  
www.isoc.org IN AAAA 2001:41c8:20:19





signed information

oc.org IN A 212.110.167.157

oc.org IN AAAA 2001:41c8:20::19



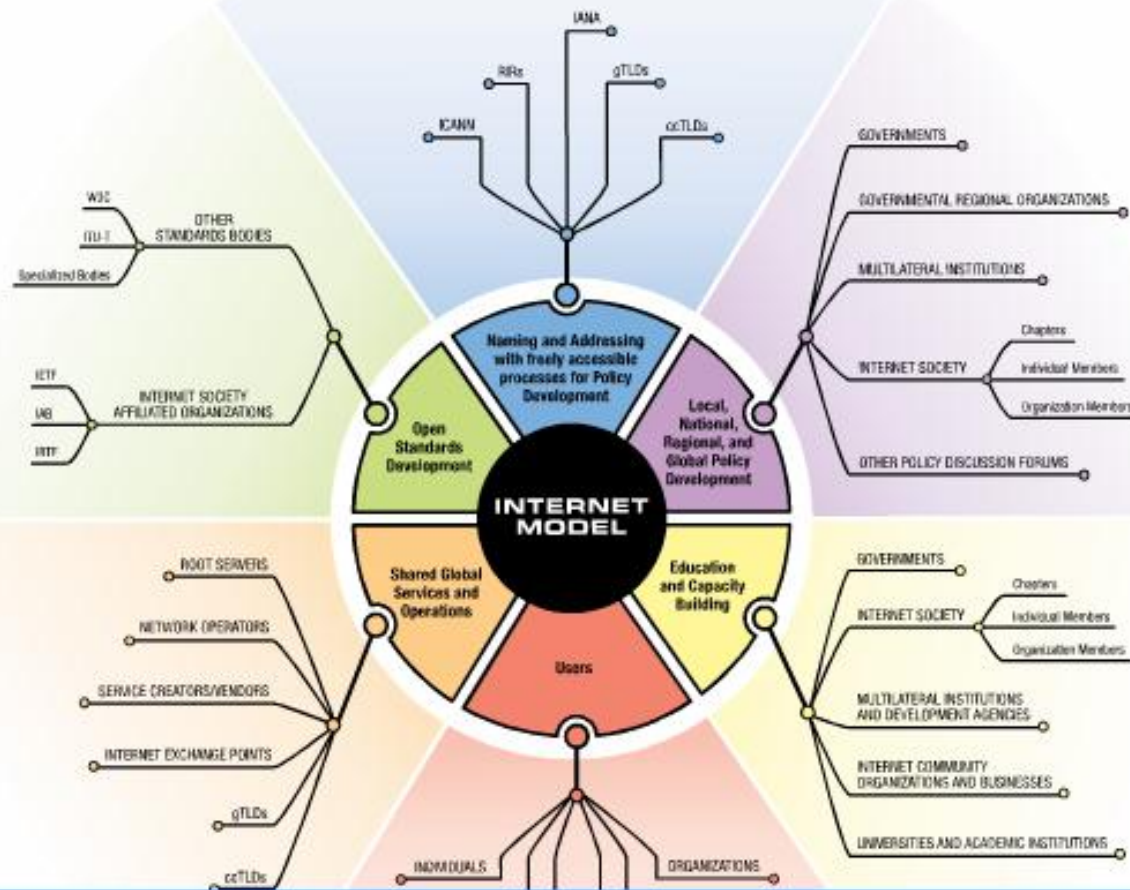
Response



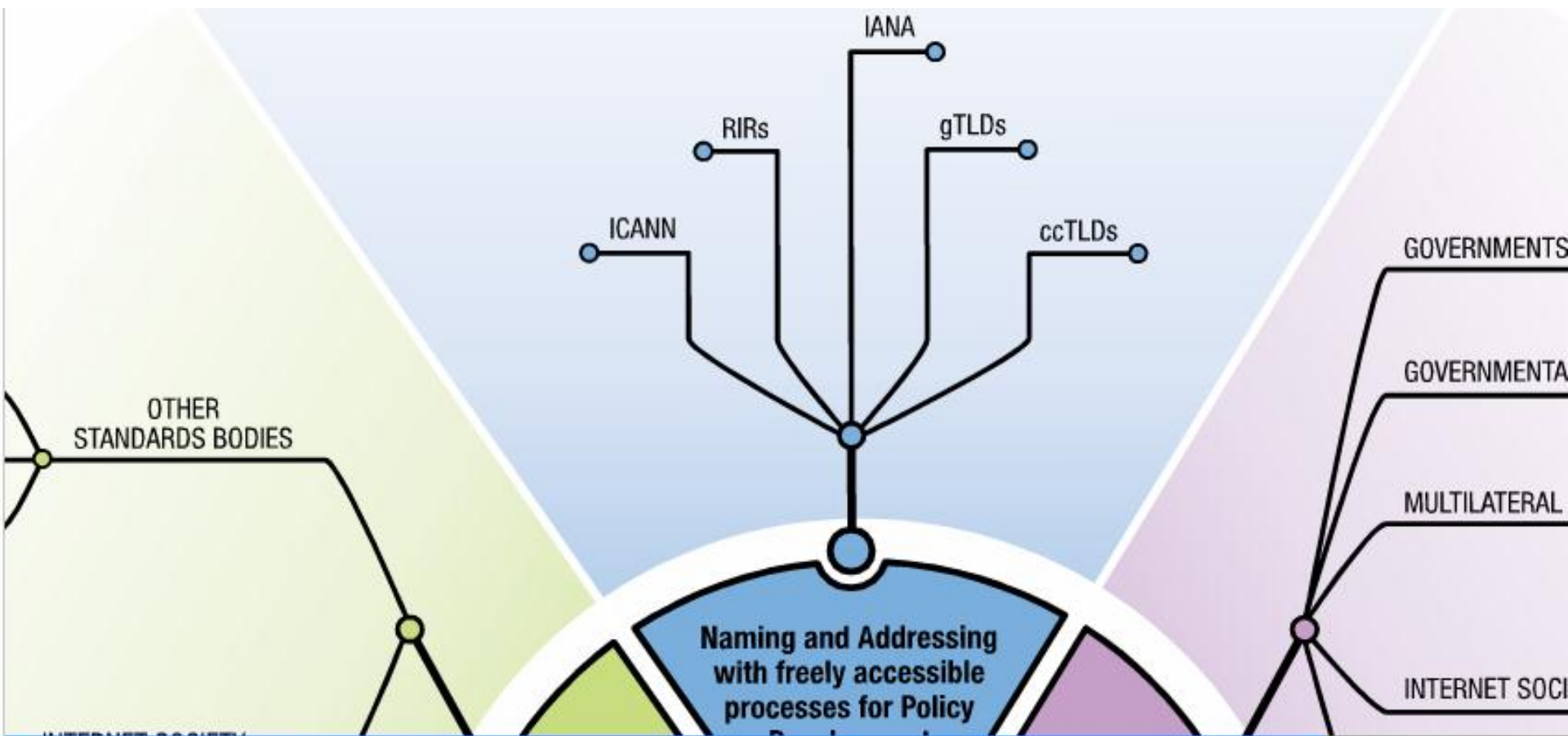
IPv4: 212.110.167.157

IPv6: 2001:41c8:20::19









OTHER  
STANDARDS BODIES

ICANN

RIRs

IANA

gTLDs

ccTLDs

**Naming and Addressing  
with freely accessible  
processes for Policy**

GOVERNMENTS

GOVERNMENTAL

MULTILATERAL

INTERNET SOCIETY



RIR SERVICE REGIONS

ARIN  
American Registry for Internet Numbers

RIPE  
NCC



lacnic

APNIC

AFRINIC  
African Registry for Internet Numbers



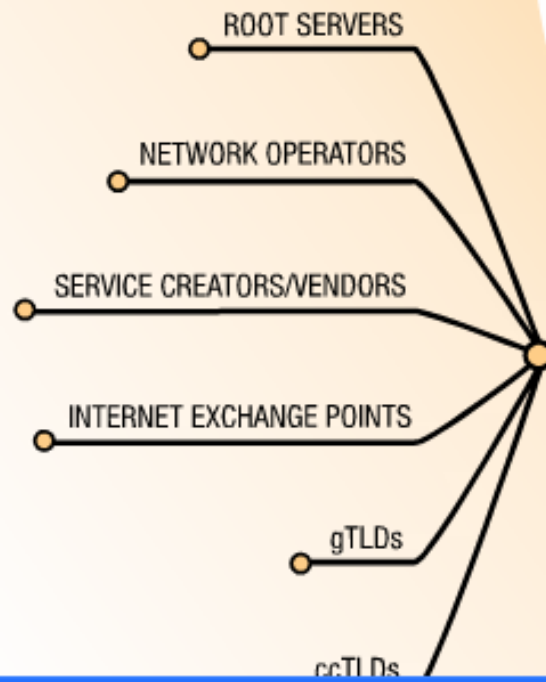
IRTF

Standards  
Development

# INTERNET MODEL

Shared Global  
Services and  
Operations

Users



INDIVIDUALS



## Internet Approach to Security Issues

```
graph LR; A[Collective responsibility (BCP 38)  
Cooperation (CSIRTs)  
Bottom up processes (Open forums)  
Multistakeholder] --> B[Trust on open standards, strong  
and trustable development  
processes  
Fast adaptation to new threats,  
innovation, faster turnaround  
(research to Implementation)]; B --> C[Preserving End to End  
model  
User awareness  
Privacy tools];
```

Collective responsibility (BCP 38)  
Cooperation (CSIRTs)  
Bottom up processes (Open forums)  
Multistakeholder

Trust on open standards, strong  
and trustable development  
processes  
Fast adaptation to new threats,  
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Preserving End to End  
model  
User awareness  
Privacy tools





Collective responsibility (BCP 38)  
Cooperation (CSIRTs)  
Bottom up processes (Open forums)  
Multistakeholder



ms)



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ts.



Preserving End to End  
model  
User awareness  
Privacy tools



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