THE CYBER ECOSYSTEM of IP RESOURCES

A holistic view of the cyber ecosystem must be brought into the discussion

1 THE CHALLENGES of IP Resources

The Checks & Balancers

Technical · Psychological · Transparency · Convenience · Social · Accountability · Economic · Security · Trust · Privacy · Norms

CHALLENGES EXPLAINED

- Internet innovation, digital transformation and digital divide.
- Addressing the global coordination and norms as the internet operates without borders and governs differently in regions.
- Understanding that technology can be used for good and bad as we at times still struggle to define the difference.

2 THE STAKEHOLDERS of IP Resources

Multi-Stakeholder Explained

IANA · Government · Academia · IETF · Business · NRO · Civil Society · Internet Users · Technical

MULTI-STAKEHOLDER EXPLAINED

- ICANN: the coordination of the global internet's unique identifiers.
- IANA: maintains the global internet number resources.
- Number Resource Organization: A coordinating body for the five regional internet registries (RIRS).
- Who else is involved? There are numerous other key governance actors and stakeholders.

*THE PUBLIC CORE of the INTERNET

3 THE DISTRIBUTORS of IP Resources

Allocation & Assignment of IP Resources

RIRS

IP Addresses & Autonomous System Numbers (ASN's)

REGISTRAR → DIRECT ALLOCATION → ORG → REALLOCATION → ORG → CUSTOMER
DIRECT ASSIGNMENT → ORG; REASSIGNMENT → CUSTOMER
ORGANIZATIONS · ORGANIZATIONS

DOMAIN REGISTRY PROCESS

ICANN · ROOT SERVER OPERATOR · REGISTRY OPERATOR · TLD OPERATORS · REGISTRY · REGISTRAR · REGISTRANT
NUMBER RESOURCE ORGANIZATION (NRO) · ARIN · RIPE · AFRNIC · LACNIC · APNIC

DISTRIBUTION EXPLAINED

- RIRs recieve address space in large IP blocks from IANA.
- Allocate smaller IP resource blocks and Domain Name resources to organizations in their regions, who may then re-allocate or re-assign those IP resources to others.

Internet Numbers Registry

DNS EXPLAINED

The Domain Name Systems (DNS) is like a phone-book of the Internet. DNS uses technology like, CHAIN of TRUST, WEB OF TRUST, DNSSEC, TLS, PKI RPKI, DMARC, SPF,RPZ for security and authentication.

DNS → REGIONAL ISP → CLIENT → USER (Request Response); DNS → DATA CENTER or ISP → WEB SERVER → CONTENT (DNS Lookup DNS Response); BACKBONE NETWORK SERVICE PROVIDER

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4 THE ROUTING PROVIDERS of IP Resources

Pathway Providers of IP Resources

The Internet Backbone (IP Network)

TIER 1 Backbone Backhaul provider (AS 65020, AS 65030, AS 65040, AS 65050)
TIER 2 Regional provider
TIER 3 Local ISP last mile Infrastructure & Distribution Partnership
Transit POP · IXP, Peering · Single homed · Multihomed

Infrastructure Layer (the backbone)

Submarine & Terrestrial Cables · Wireless Systems · Satellite · Internet Exchange Points (IPX)

Plus +

Digital Transformation from Old Distribution Tier Network to New Diversified Network

External & Internal DNS Providers DYN Cloudflare Google AWS Alibabi OpenDNS Akama DYN & Others

Internet Routing Registry

THE GLOBAL DISTRIBUTED PATHWAY PRODIVERS

THE DATA PATHWAY EXPLAINED

- The Carriers, Network & Internet Service providers
- A place where all systems that enable connectivity and operability of physical facilities of providers of internet services.
- Utilizing protocol BGP The pathway providers Announce, Control & Modify the Routing of Addresses and Domain Route of Data.

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5 THE INTERNET SERVICE & NETWORK PROVIDERS of IP Resources

IP Resources Closest to Customers: TIER 3 & Local ISP's

DNS Control Panel

- Change the DNS Pathway
- Reseller Account Root
- Alpha Master WHM
- C-Panel

SERVER SPACE

- Dedicated
- Managed
- Colocation
- Cluster
- Shared
- Virtual Private Server
- Abused Comprimised

PHP · RUBY · PYTHON

Business Organization University · Home · Data Center · Mobile User · Wireless Access Point · Internet Access & Services

Common IPS Network Switching & Routing Network

The Last Mile. The ISP closes to clients & has the customer relationships

THE LAST MILE EXPLAINED

- Cloud computing: shared computing, software, storage and information resources are accessed as a service on demand.
- Wholesale and Resellers of hosting Reallocated & Reassigned
- Net-blocks, IP addresses Bandwidth, voip, domains sold as Public & Hybrid white labeled solutions.
- Tor, dark web block chain, cryptocurrency- all used for good and bad.
- Bulletproof Hosting.

6 THE USERS of IP Resources

Your Home and Business Network - Explained

Layers · Application · Endpoint OT/IOT · Virtualization & · Cloud Technology · Data Center Infrastructure

7 THE ABUSERS of IP Resources — ATTACKS

The Adversary Explained

1. Nation State - Warfare, Terrorism, Espionage
2. Hacktivist - Mischief
3. Cyber - Criminal
4. Competitors
5. Insiders

8 THE DEFENDERS of IP Resources

THE CYBER DEFENSE EXPLAINED

All have different priorities

- Government-Intelligence
- Law Enforcement - Prosecution
- CERTS (respond)
- Private Sector- Profit Driven
- Researchers & Academia
- Non-Government Organization

INFORMATION SECURITY - PROTECTING DATA, PROCESSES & PEOPLE

TWO DISTINCT DISCIPLINES

INFORMATION TECHNOLOGY - DEPLOY PEOPLE, PROCESSES & TECHNOLOGY

DEFEND

9A THE COUNTERMEASURES of IP Resources

CYBER DEFENSE & COUNTERMEASURES AUTOMATED MONITORING

Application hardening, EPP, EDR, MDR, SIEM, MSSP,NGFW, DLP, IPS, IDS, SWG, CASB, MI, AI, Strategic Consulting, Threat Intelligence, RISK management, frameworks, guidelines, etc.

9B THE RESPONDERS of IP Resources

RECOVERY EXPLAINED

- Triage or full forensic gathering, analysis, recovery and reporting of data at rest, data in use and data in motion to get back up to a safe state.
- Business continuity, disaster recovery, cyber insurance.

10 SECURITY VS PRIVACY of IP Resources

VS

SECURITY VS PRIVACY EXPLAINED

Privacy relates to the appropriate use of your data, collect and misuse

Security relates to the trust & confidence of your data, the use, storage and how its processed.

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