

# 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



IETF



Government



Academia



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.

3

## THE DISTRIBUTORS of IP Resources



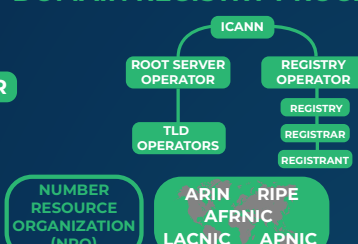
Allocation & Assignment of IP Resources

RIRs

IP Addresses & Autonomous System Numbers (ASN's)



### DOMAIN REGISTRY PROCESS



### DISTRIBUTION EXPLAINED

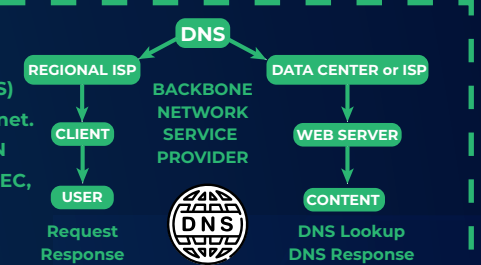
- RIRs receive address space in large IP blocks from IANA.
- Allocate smaller IP resource blocks and Domain Name resources to organizations in their regions, who may then re-allocate or re-assign those IP resources to others.

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.



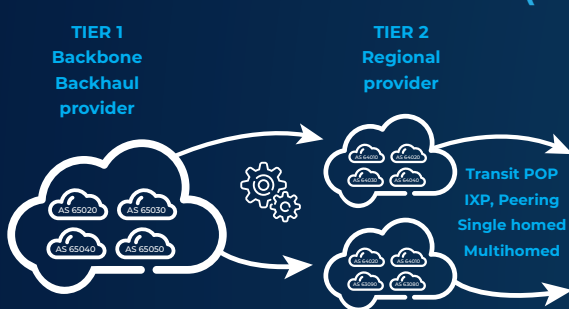
4

## THE ROUTING PROVIDERS of IP Resources

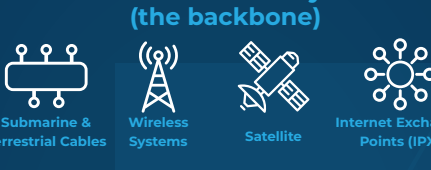


Pathway Providers of IP Resources

### The Internet Backbone (IP Network)



### Infrastructure Layer (the backbone)



Internet Routing Registry



THE GLOBAL DISTRIBUTED

PATHWAY PROVIDERS

### 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.

5

## THE INTERNET SERVICE & NETWORK PROVIDERS of IP Resources



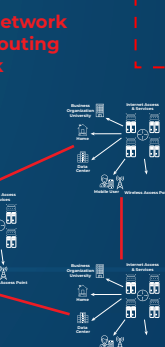
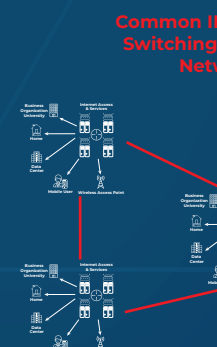
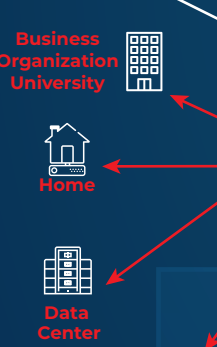
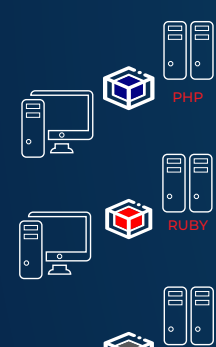
IP Resources Closest to Customers: TIER 3 & Local ISP's

### 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 Comprised



### 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.

7

## THE ABUSERS of IP Resources



### The Adversary Explained

- Nation State - Warfare, Terrorism, Espionage
- Hacktivist - Mischief
- Cyber - Criminal
- Competitors
- Insiders

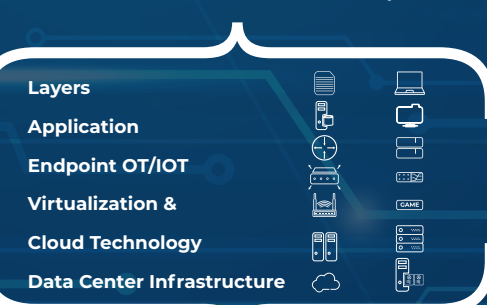
### ATTACKS

6

## THE USERS of IP Resources



### Your Home and Business Network - Explained



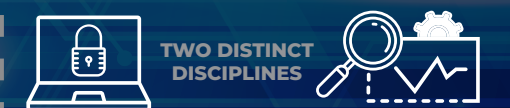
8

## 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



### 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



### 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.

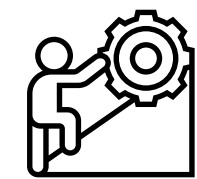
# THE CYBER ECOSYSTEM of IP RESOURCES

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

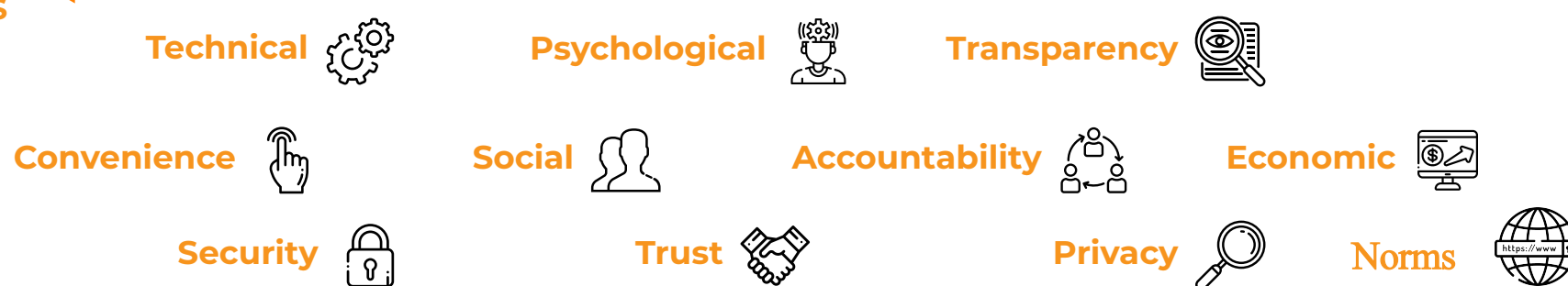


1

## THE CHALLENGES of IP Resources



The Checks & Balancers



### CHALLENGES EXPLAINED

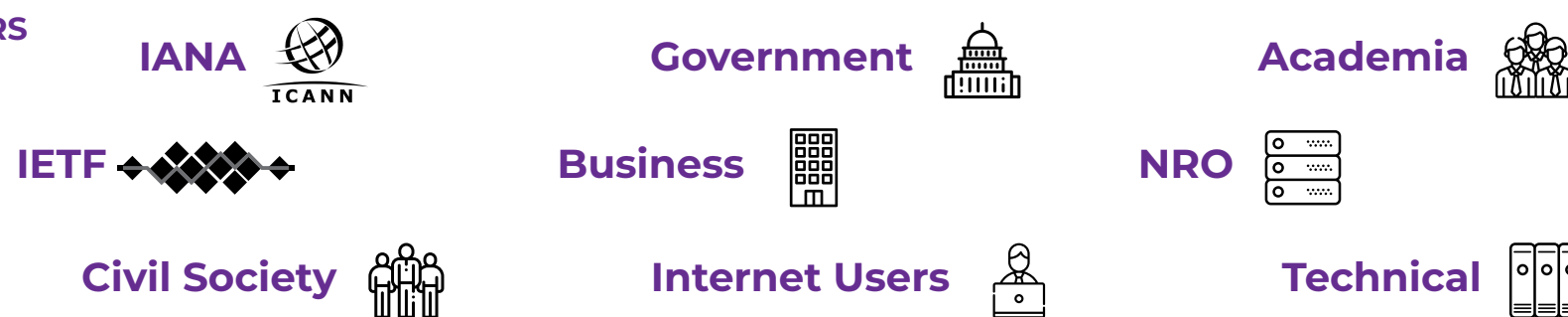
- Internet innovation, digital transformation and digital divide.
- Addressing the global coordination and norms as the internet operates without borders and governs differently in regions.
- Understanding that technology can be used for good and bad as we at times still struggle to define the difference.

2

## THE STAKEHOLDERS of IP Resources



Multi-Stakeholder Explained

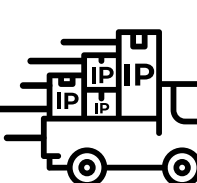


### MULTI-STAKEHOLDER EXPLAINED

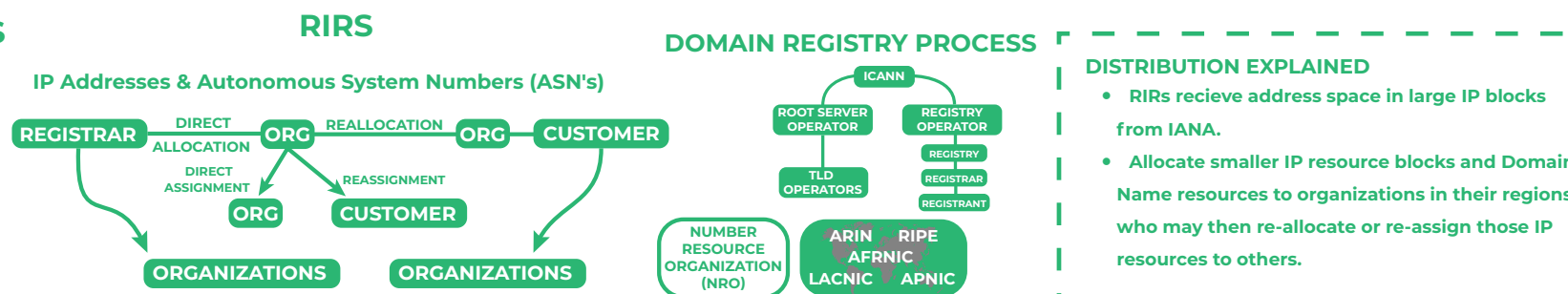
- ICANN: the coordination of the global internet's unique identifiers.
- IANA: maintains the global internet number resources.
- Number Resource Organization: A coordinating body for the five regional internet registries (RIRs).
- Who else is involved? There are numerous other key governance actors and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

3

## THE DISTRIBUTORS of IP Resources



Allocation & Assignment of IP Resources

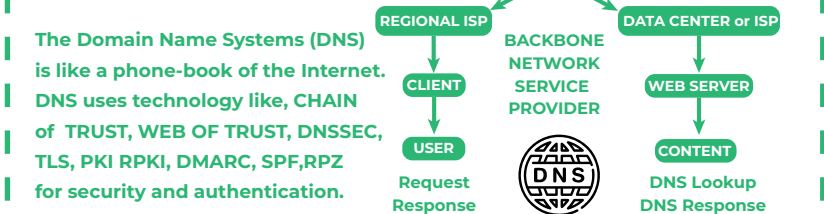


### DISTRIBUTION EXPLAINED

- RIRs receive 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

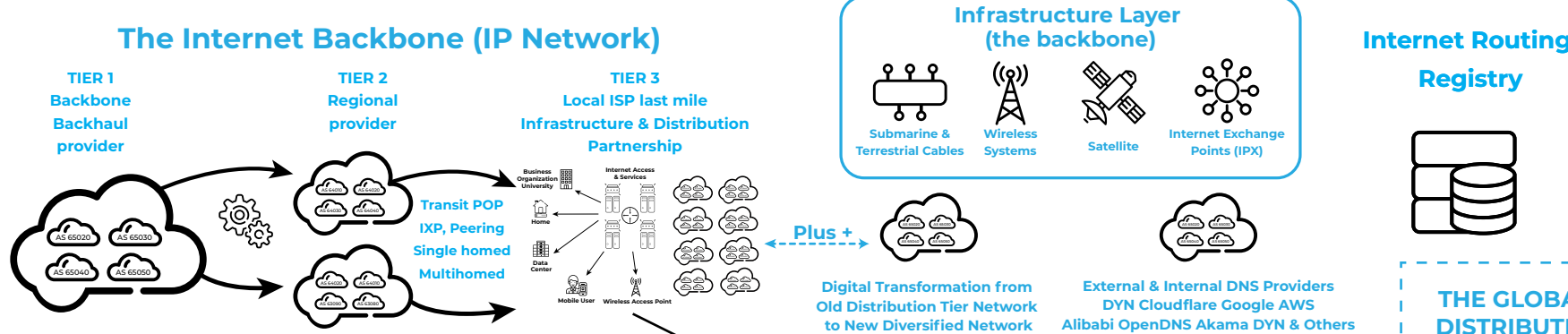


4

## THE ROUTING PROVIDERS of IP Resources



Pathway Providers of IP Resources

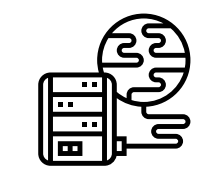


### THE DATA PATHWAY EXPLAINED

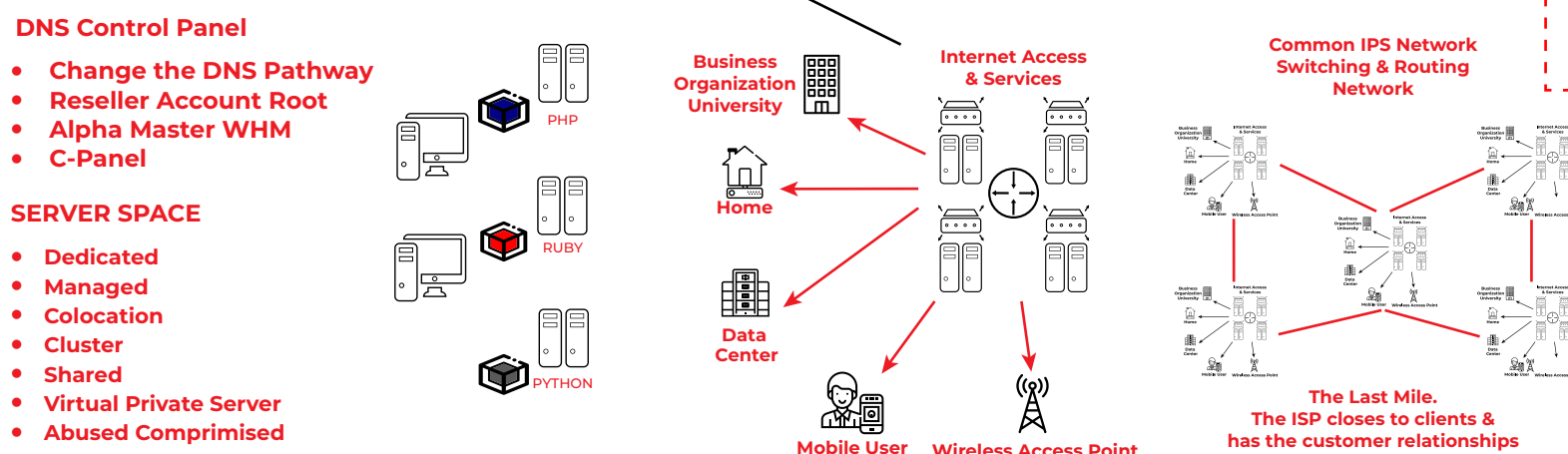
- The Carriers, Network & Internet Service providers
- A place where all systems that enable connectivity and operability of physical facilities of providers of internet services.
- Utilizing protocol BGP The pathway providers Announce, Control & Modify the Routing of Addresses and Domain Route of Data.

5

## THE INTERNET SERVICE & NETWORK PROVIDERS of IP Resources



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

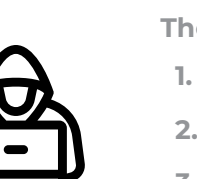


### THE LAST MILE EXPLAINED

- 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.

7

## THE ABUSERS of IP Resources



The Adversary Explained

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

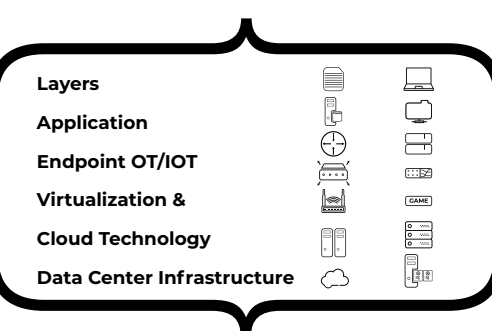
### ATTACKS

6

## THE USERS of IP Resources



Your Home and Business Network - Explained



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



### 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, ML, 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



### SECURITY VS PRIVACY EXPLAINED

- Privacy relates to the appropriate use of your data, the use, collect and misuse
- Security relates to the trust & confidence of your data, the use, storage and how its processed.