

Internet Protocol v. 6

Denis Smajlović

Agenda

- IP address theory
  - Counting in hex
- Subnetting
  - IPv4
  - IPv6
- Reading an IPv6 address
- Current-day home network architecture
  - Network Address Translation (NAT)
- History of IP
- Theory behind NAT and firewalls
- Layout of a modern IPv6 home network
- IPv4 / IPv6 dual-stack
- IPv6 security implication

IPv4

192.168.1.27

IP address	192.168.1.27
Subnet mask	255.255.255.0

IP address	192.168.1.27
Subnet mask	255.255.255.0
Default gateway	192.168.1.1

IP address	192.168.1.27
Subnet mask	255.255.255.0
Default gateway	192.168.1.1

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192.168.1.27



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11000000 . 10101000 . 00000001 . 00011011

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11111111 . 11111111 . 11111111 . 00000000

192.168.1.27

11000000 . 10101000 . 00000001 . 00011011

192.168.1.189

11000000 . 10101000 . 00000001 . 10111101

192.168.1.27

11000000 . 10101000 . 00000001 . 00011011

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11000000 . 10101000 . 00000001 . 00011011

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IP with CIDR

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IP with CIDR

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IP with CIDR

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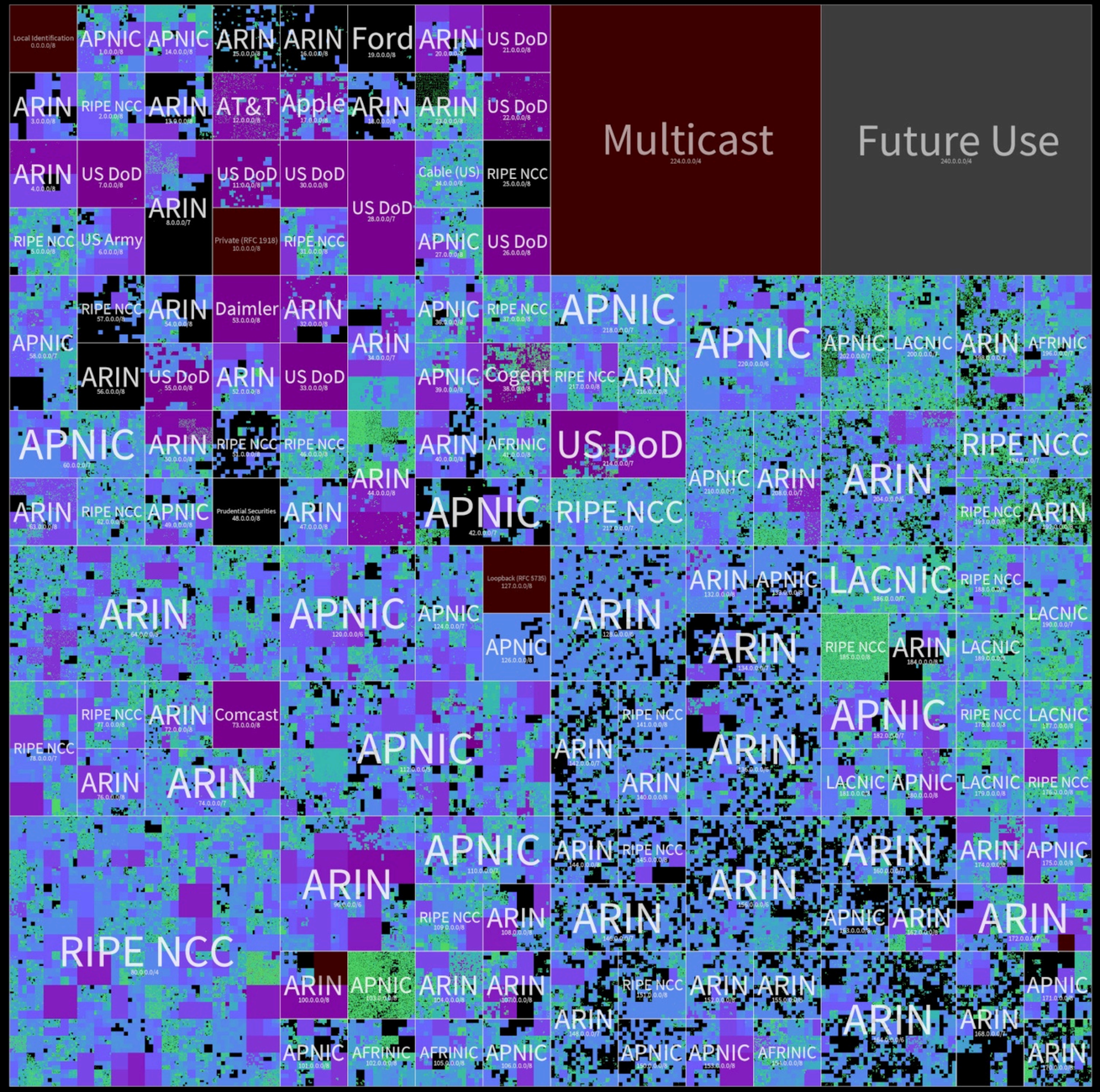
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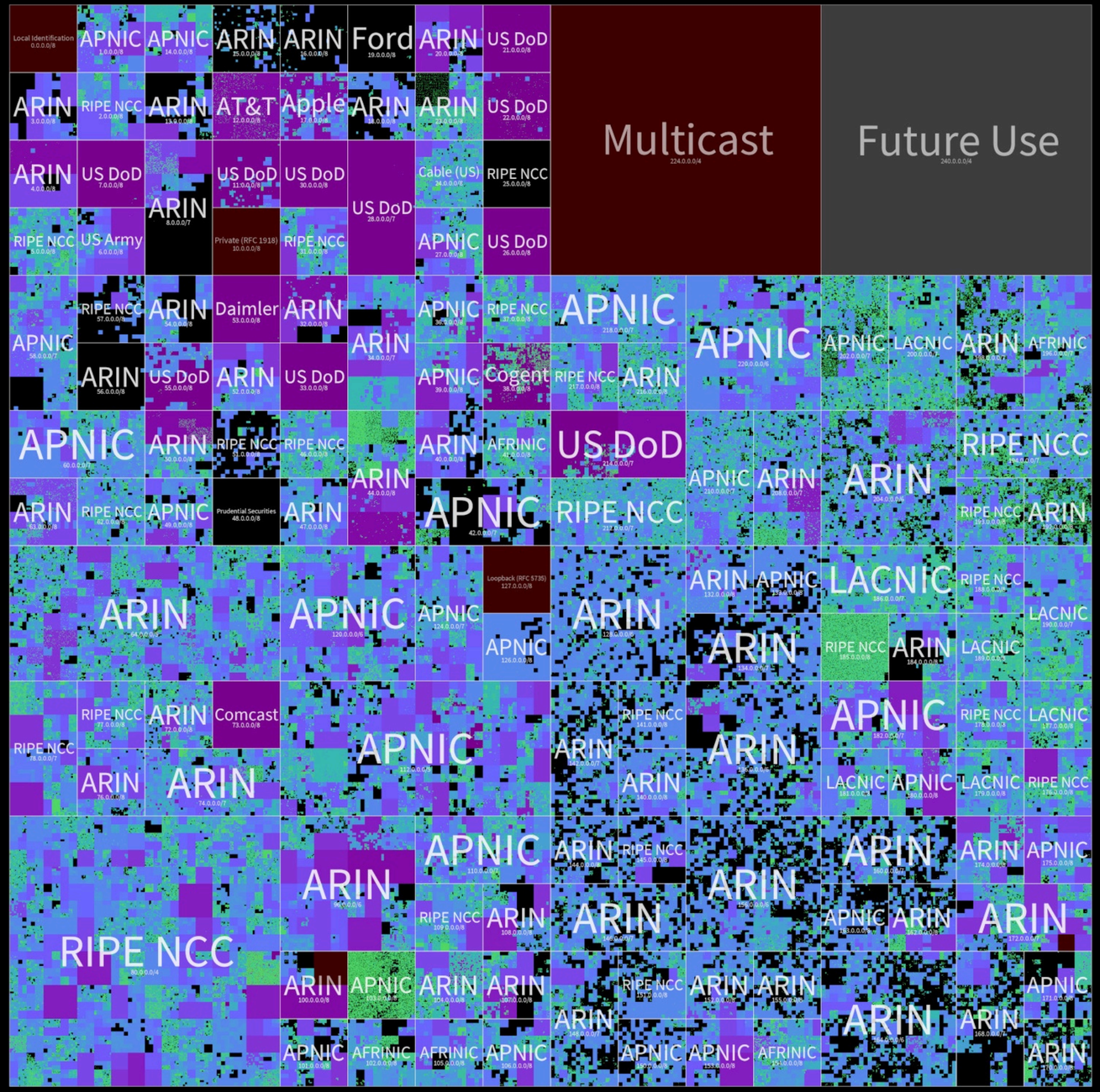
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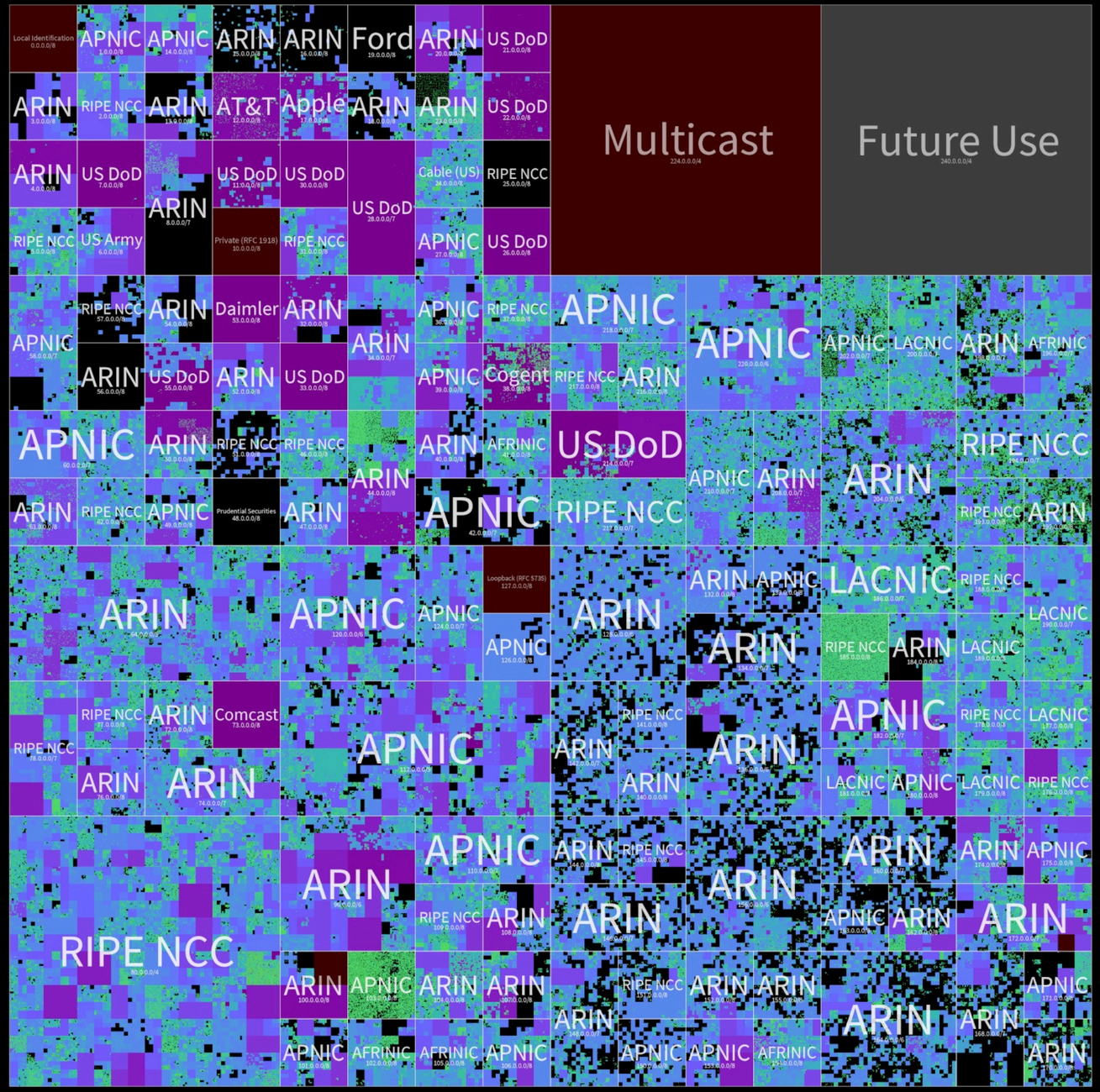
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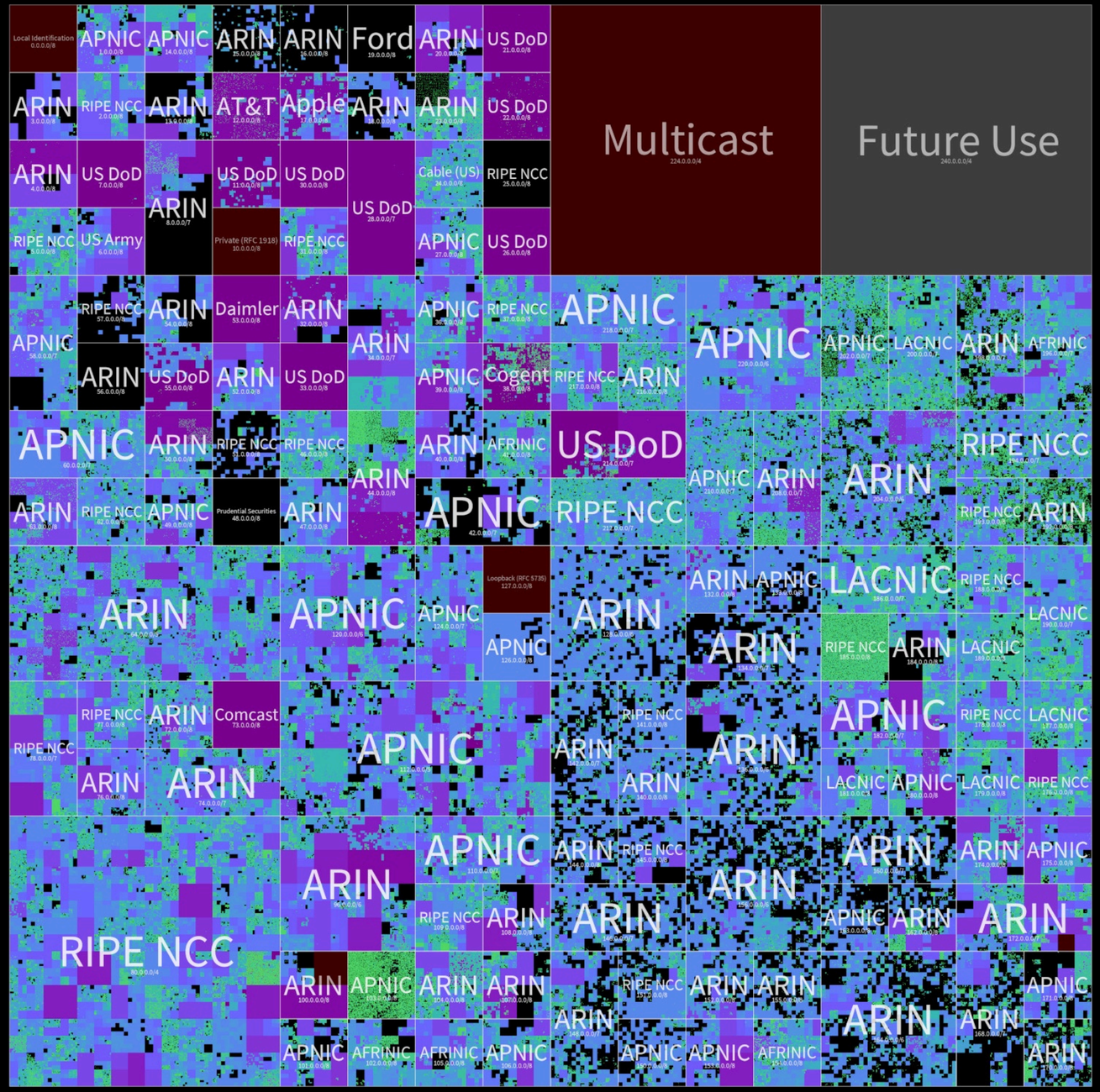
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IPv6

146.89.1.27.45.60.114.252.142.251.46.174.23.62.46.14

2607:f8b0:4005:0811:0000:0000:0000:200e

2607:f8b0:4005:0811:0000:0000:0000:200e

200e

200e

ffff

002f

2607:f8b0:4005:0811:0000:0000:0000:200e

2607:f8b0:4005:0811:0000:0000:0000:200e

2607:f8b0:4005:0811:0000:0000:0000:200e/64

Stateless address auto configuration (SLAAC)

Stateless address auto configuration (SLAAC)

Privacy extensions

2607:f8b0:4005:0811:0000:0000:0000:200e/64

Privacy extensions

Privacy extensions

2607:f8b0:4005:0811:0000:0000:0000:200e/64

2607:f8b0:4005:0811:aa6d:4154:7320:95b9/64

2607:f8b0:4005:0811:0ded:83c1:837f:c765/64

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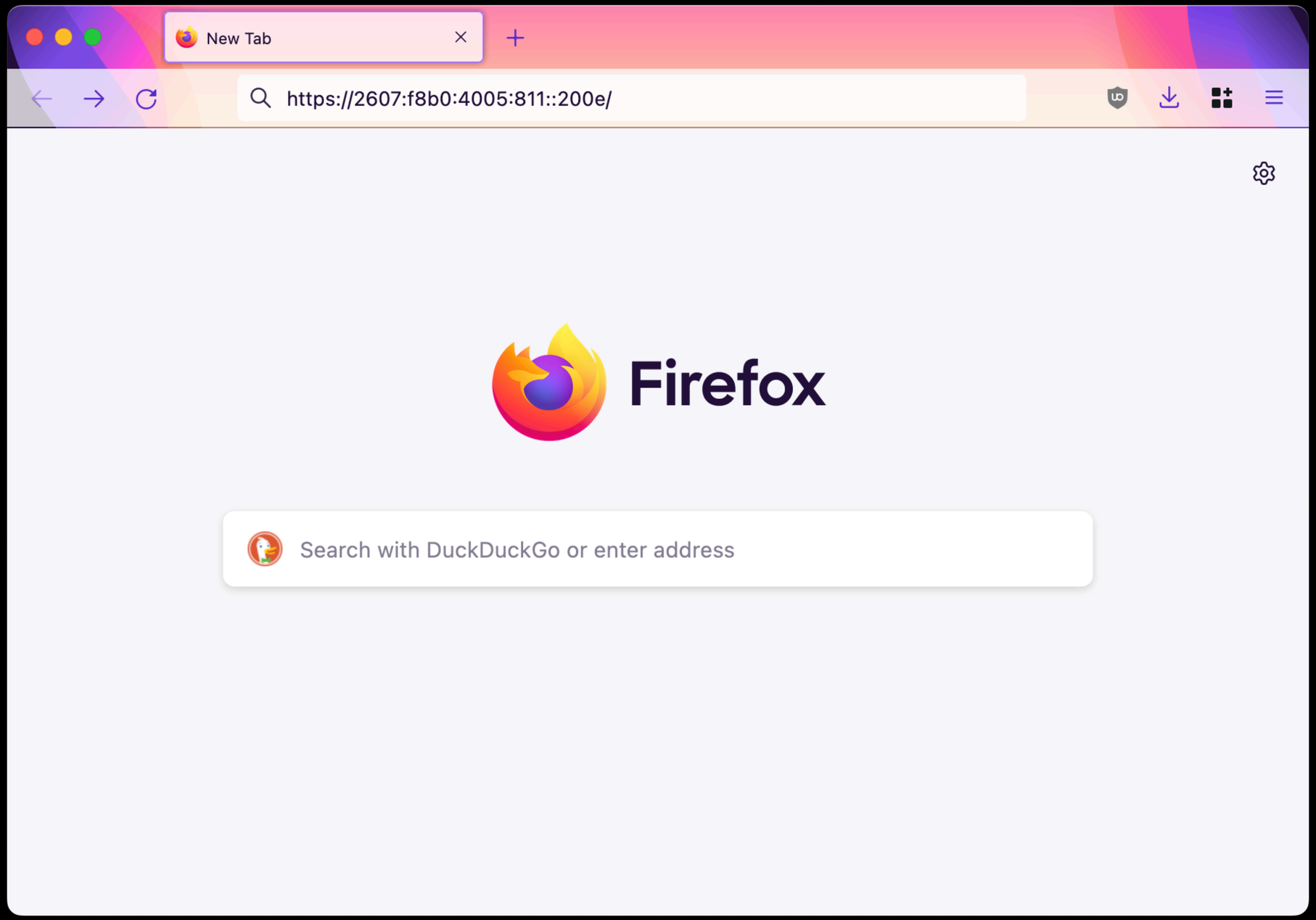
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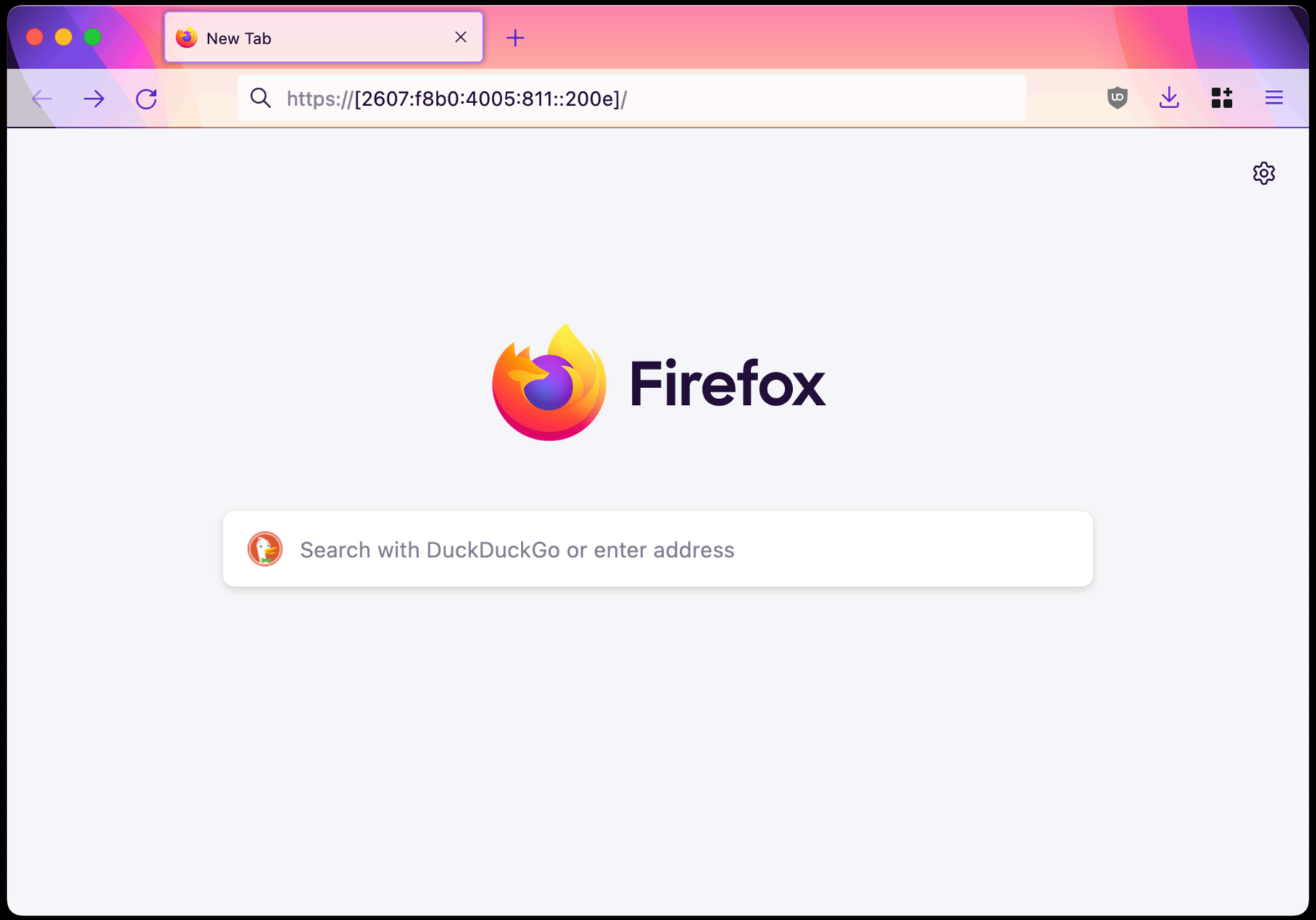
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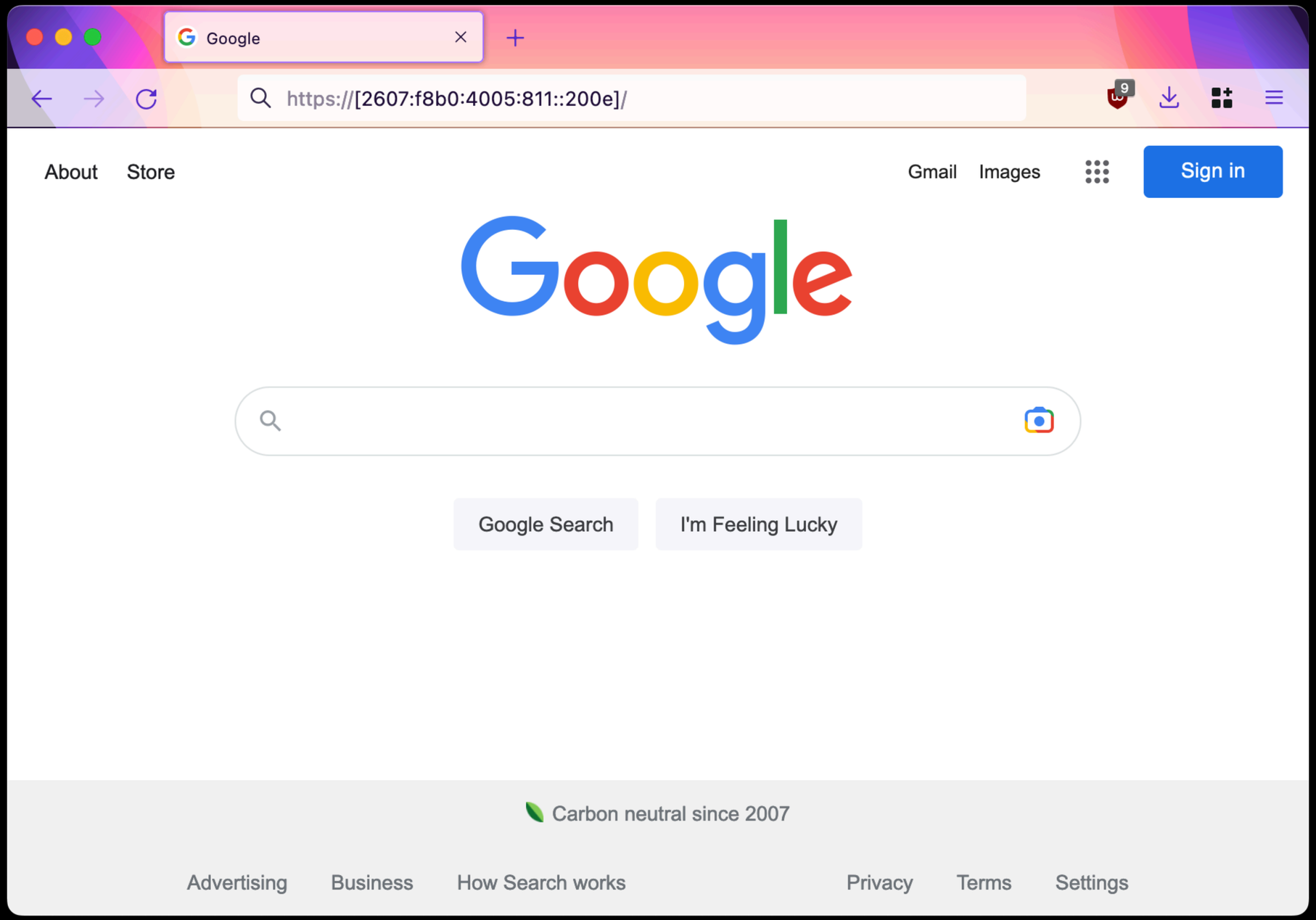
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About
Store
Gmail
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Sign in
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I'm Feeling Lucky
Carbon neutral since 2007
Advertising
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How Search works
Privacy
Terms
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Various
2000::/12
2000::/8
2100::/8
2e00::/8
2f00::/8
2300::/8
2200::/8
2d00::/8
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2630::/12
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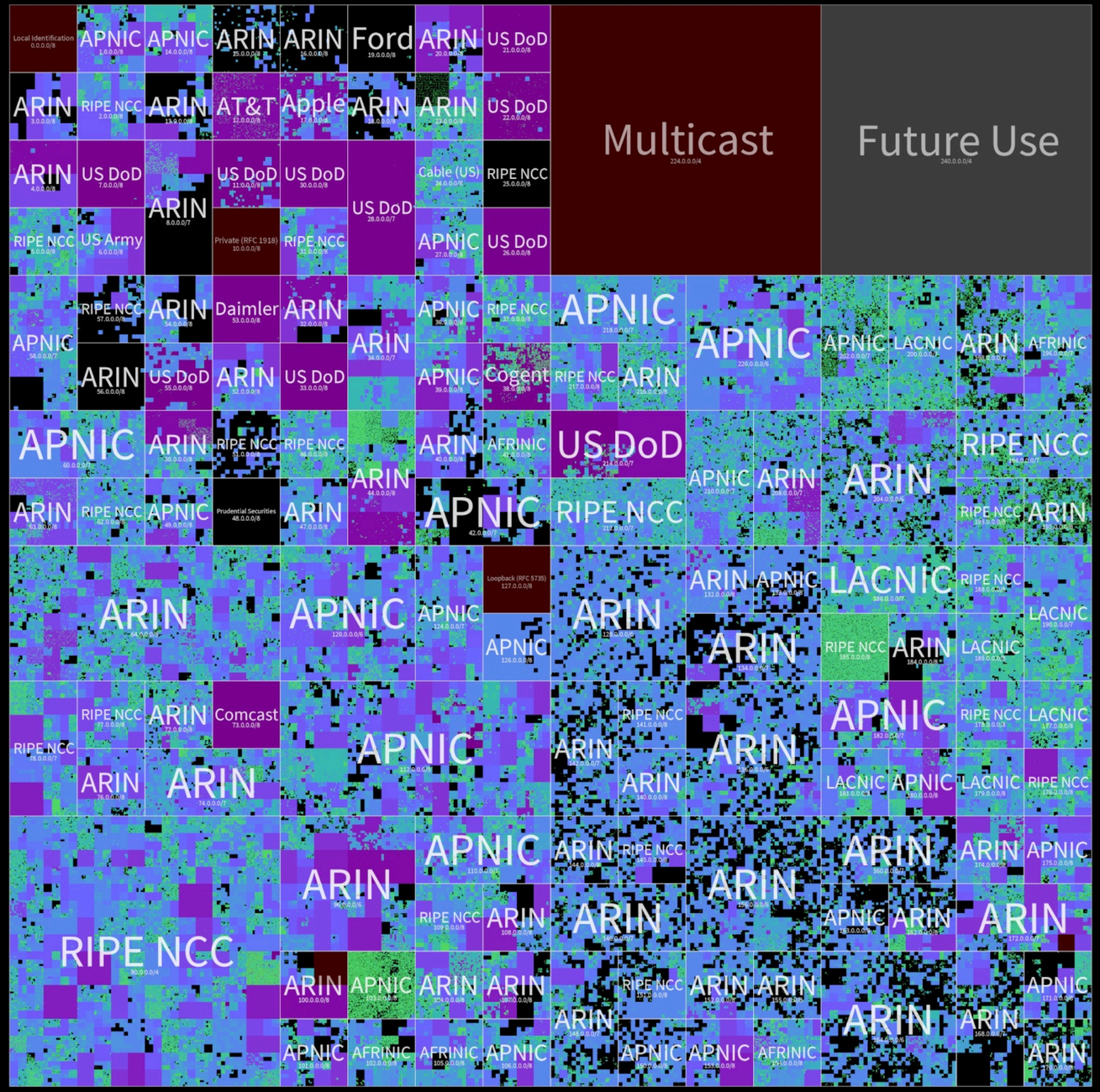
Perspectives on address space

Problems with exhausted IP space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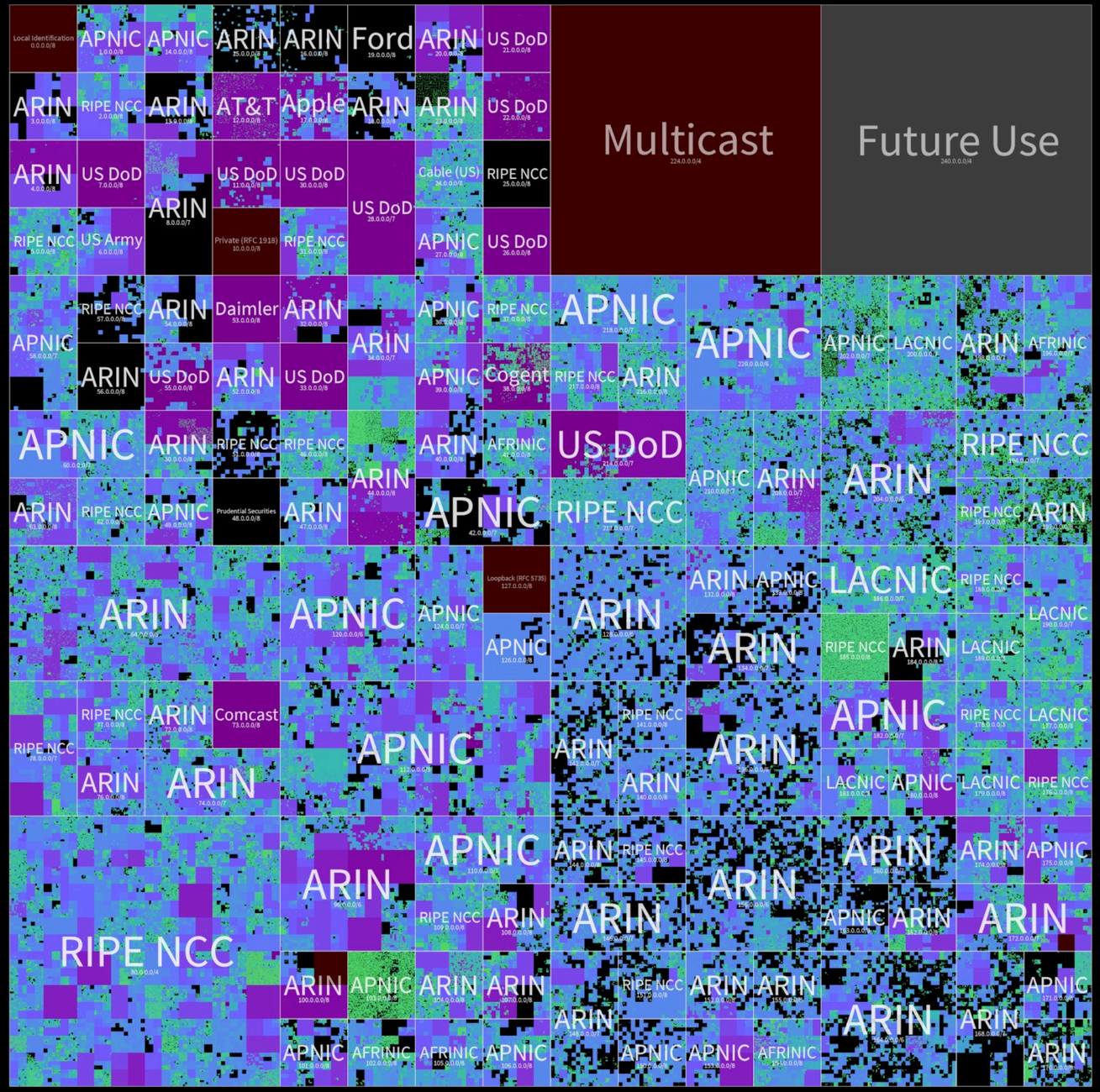
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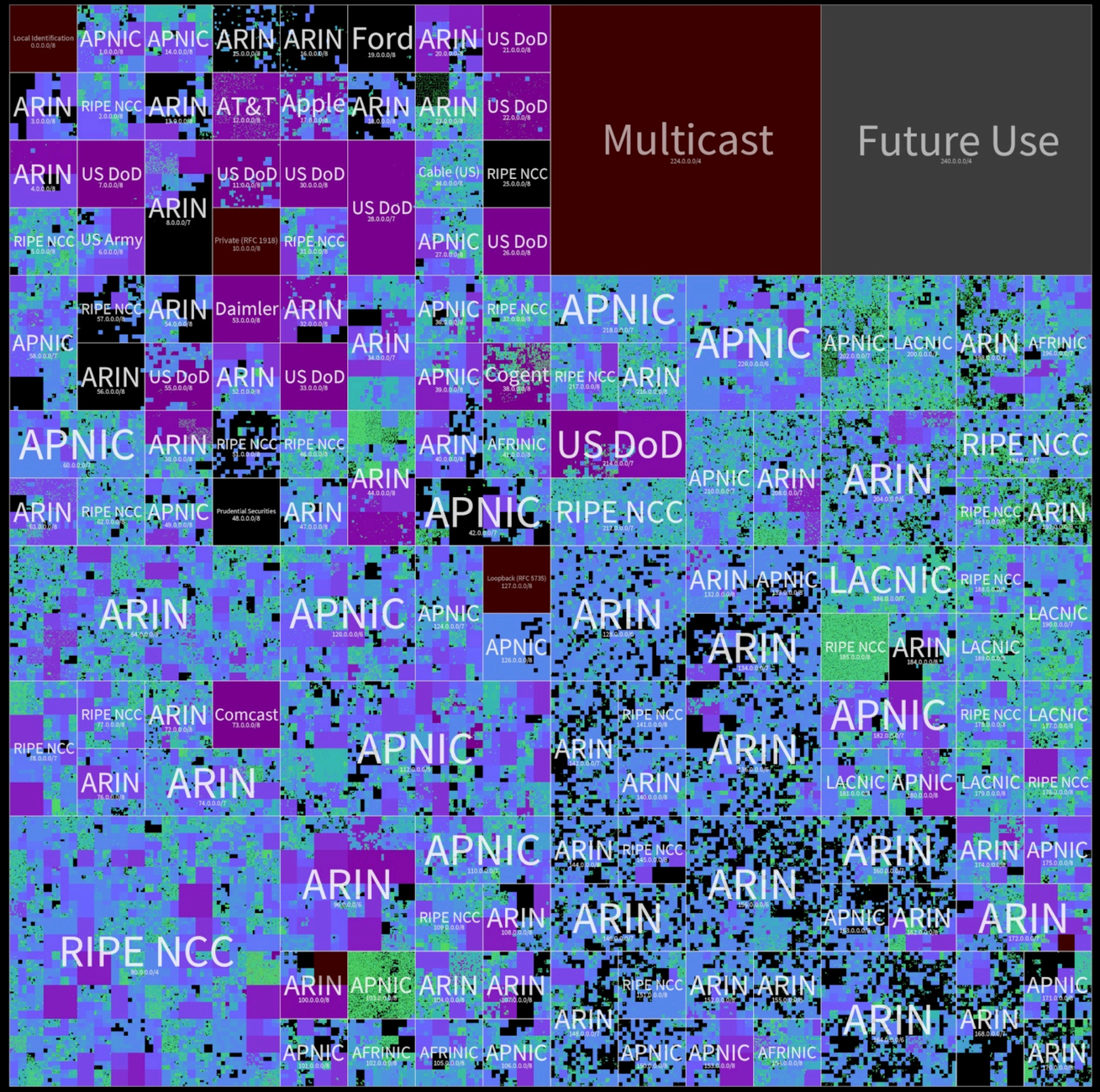
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US DoD
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Cogent
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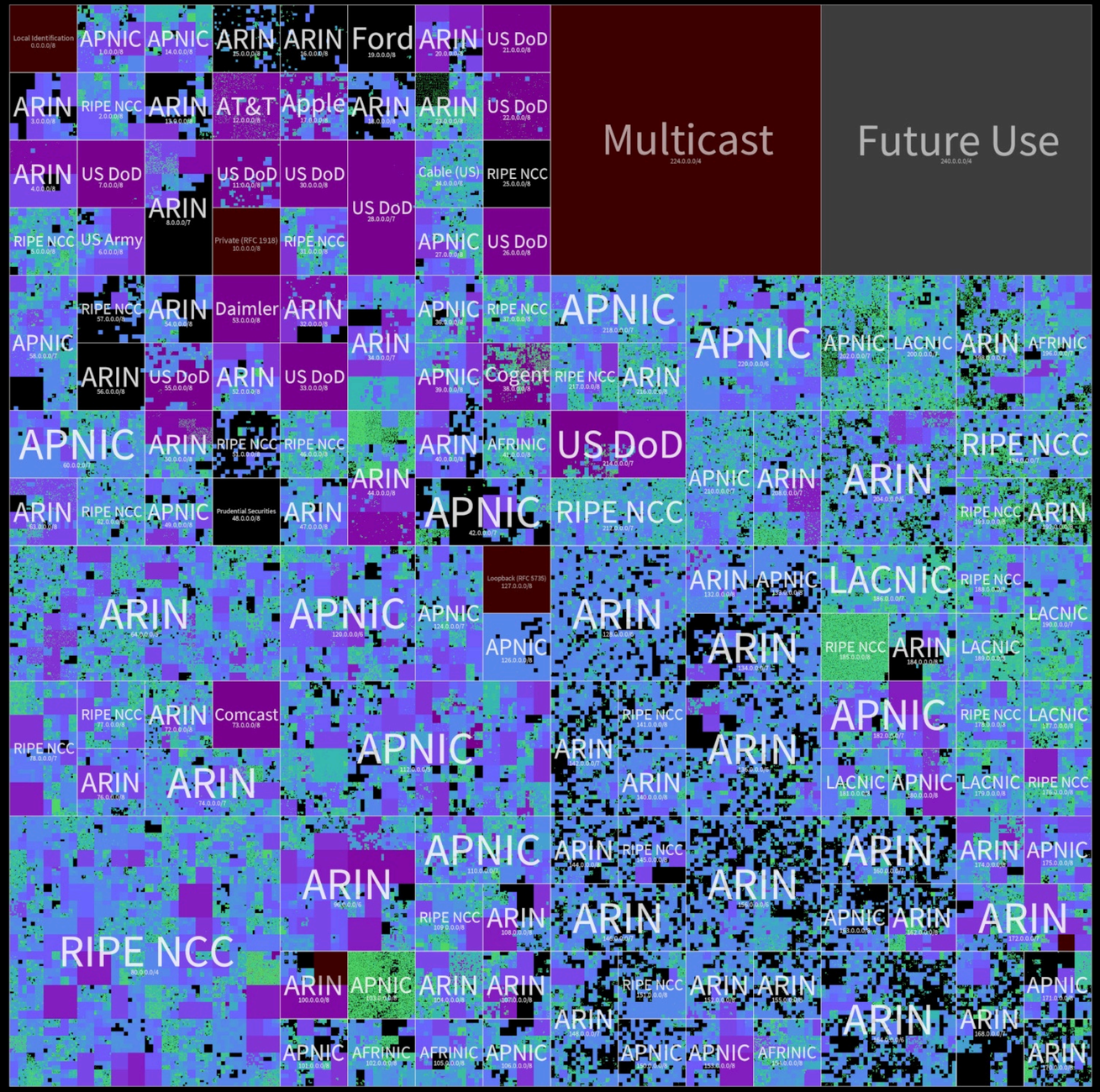
Local Identification
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US DoD
US DoD
Cable (US)
RIPE NCC
RIPE NCC
US Army
Private (RFC 1918)
RIPE NCC
APNIC
US DoD
Multicast
Future Use
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Daimler
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NAT vs. firewall

Will IPv6 addresses run out?

2000::/3

2000:0000:0000:0000:0000:0000:0000:0000/3


Various
2000::/12
2000::/8
2100::/8
2e00::/8
2f00::/8
2300::/8
2200::/8
2d00::/8
2c00::/8
AFRINIC
2c00::/12
APNIC
2400::/12
LACNIC
2800::/12
2400::/8
2700::/8
2800::/8
2b00::/8
ARIN
2600::/12
ARIN
2630::/12
RIPE NCC
2a00::/11
2500::/8
2600::/8
2900::/8
2a00::/8

BGP and the internet routing table

Security implications