Best Practices for IPv6 Subnetting

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Why have an IPv6 subnetting plan?

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Why not?

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- Few prerequisites
- Low cost
- Don’t have to redo IPv4 plan

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Why?

- Easier to enforce security policies
- Easier to understand, maintain and debug
- Better route aggregation
- Solid progress towards implementing IPv6

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Address allocation

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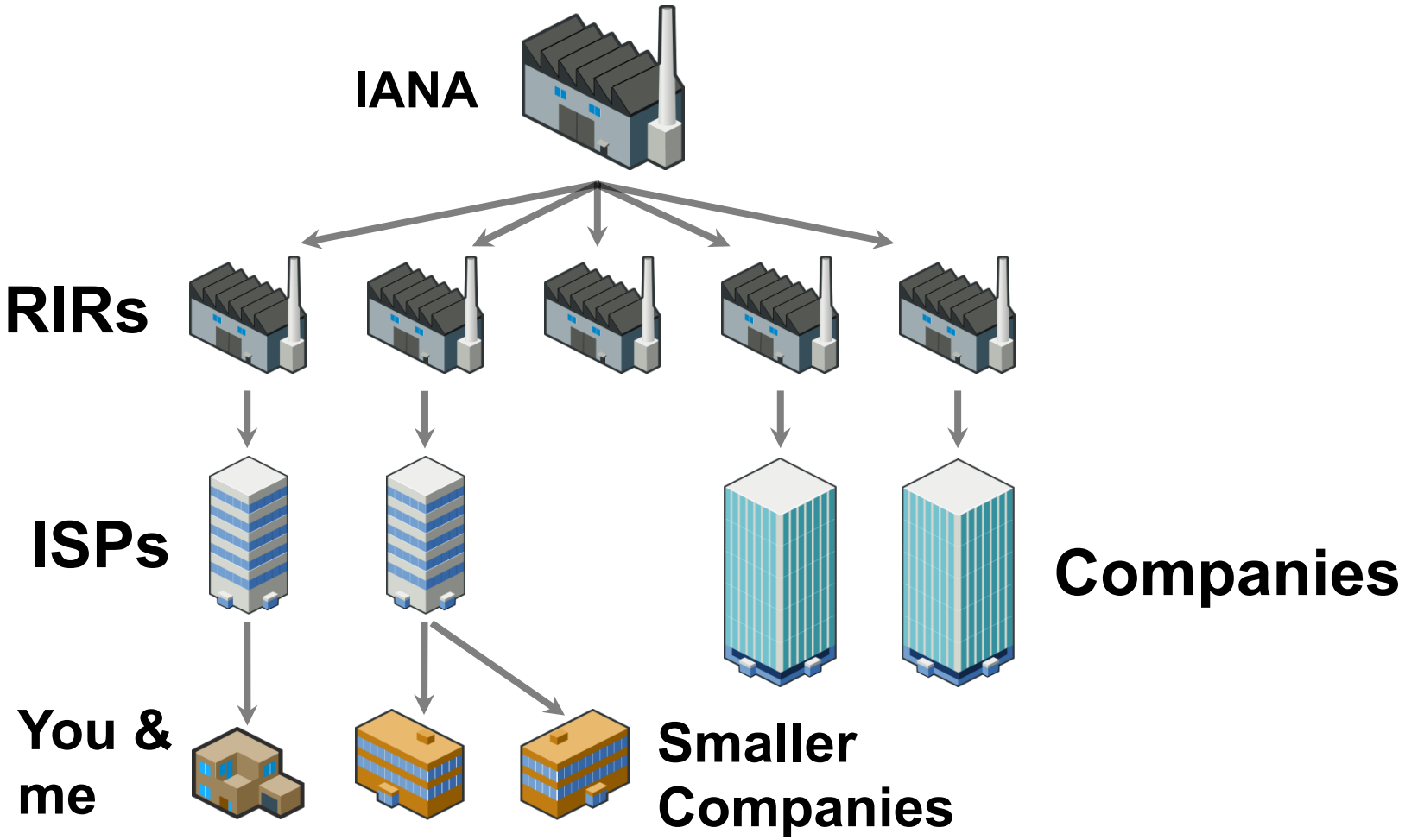
Sources of address space



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PI vs PA space

- Provider Independent: from RIR
- Provider Assigned: from ISP
- Multi-homed vs single connection

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How do I know which to get?

- Develop a subnetting plan
- Decide on a network architecture and peering/transit plan
- Use that to apply for your space

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How do I carve it up?

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Common Subnet Boundaries

- /48: most common, longest routable prefix
- /64: longest usable subnet prefix
- /127: suitable for point to point links (RFC6164 current, RFC3627 deprecated)
- /128: for router loopbacks

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More choices

- If you have multiple separate sites, each will need a /48
- Within a site, subdivide /48 on nibble boundaries
- Round up if you need more subnets

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Schemes

- **Allocate your subnets as your organization needs:**
  - By geography
  - By department
  - By function
  - By security zone

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By geography

- **Allocation from RIR: 2001:db8:1234::/48**
  - 2001:db8:1234:abcd::/52
    - Location: 4 bits = 16 locations
  - 2001:db8:1234:abcd::/56
    - Function: 4 bits = 16 functions per location
  - 2001:db8:1234:abcd::/64
    - Host subnets: 8 bits = 256 host subnets per function per location

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By function

- **Allocation from RIR: 2001:db8:1234::/48**
  - 2001:db8:1234:abcd::/52
    - Function: 4 bits = 16 functions
  - 2001:db8:1234:abcd::/56
    - Location: 4 bits = 16 locations per function
  - 2001:db8:1234:abcd::/64
    - Host subnets: 8 bits = 256 host subnets per function per location

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Think about aggregation

- Get your address space from the RIR you have the most hosts/subnets in
- Decide if you need space from all RIRs or if you will get one large allocation

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More reading

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- **ARIN:**
  - https://www.arin.net/policy/nrpm.html#six
  - https://www.arin.net/resources/request/ipv6_initial_assign.html

- **RIPE:**
  - http://www.ripe.net/ripe/docs/current-ripe-documents
  - http://www.ripe.net/ripe/docs/ripe-523

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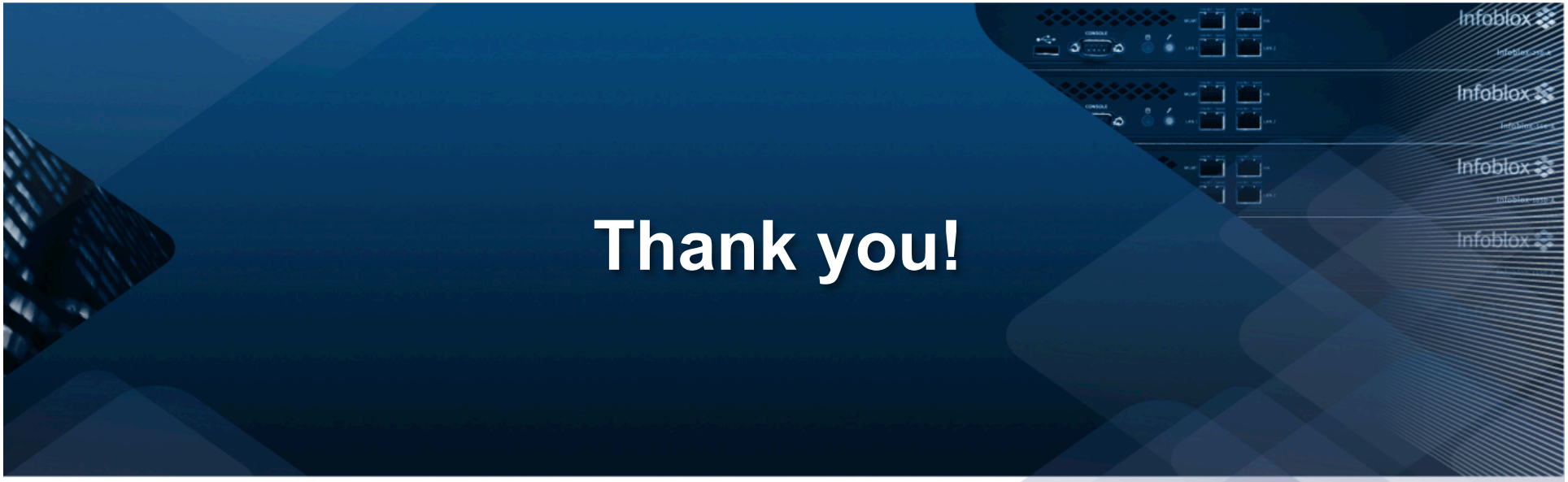

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