Architecting the Network

Multiple Internet Service Providers

Provider Interaction

Policy Issues in a Multi-provider Environment

Multiple Providers

⌘ Either a starting condition or an early evolutionary phase, due to

- ⌃ ease of access to technology
- ⌃ increasing market perception of value
- ⌃ Constraints on initial operations

⌘ You should anticipate an environment of multiple providers

Multiple Providers

⌘Are inevitable!

⌘Plan for it within the areas of
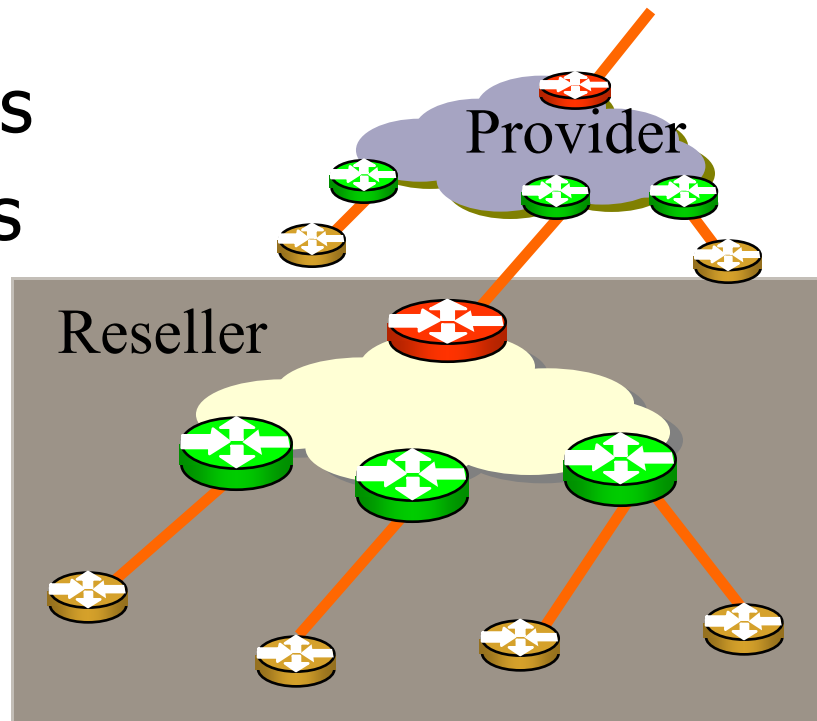- design
- policy
- business plans

The Initial Model

⌘Reselling

or

⌘Coexistence

Reselling

✤ Purchase a service from a provider

✤ Resell to high demand exposed markets, such as:

   ❑ commercial access

   ❑ community access

   ❑ dial-up

   ❑ school access

Provider

Reseller

Reselling

- Is an effective tool for Internet permeation
- Increases the marketing presence
- Increases purchased volumes of capacity for the upstream provider
  - lowering unit price of bandwidth through increased volume

Reselling

- Shares the investment risk of Internet growth
- Promotes rapid commercialisation of the Internet Service environment

Reselling

- May be counter to national regulatory environment
- May be counter to funders' requirements / constraints
- May stress management function
- May stress pricing structure
  - fewer high volume low margin clients

Reselling

- Leads to direct competitive retail environment
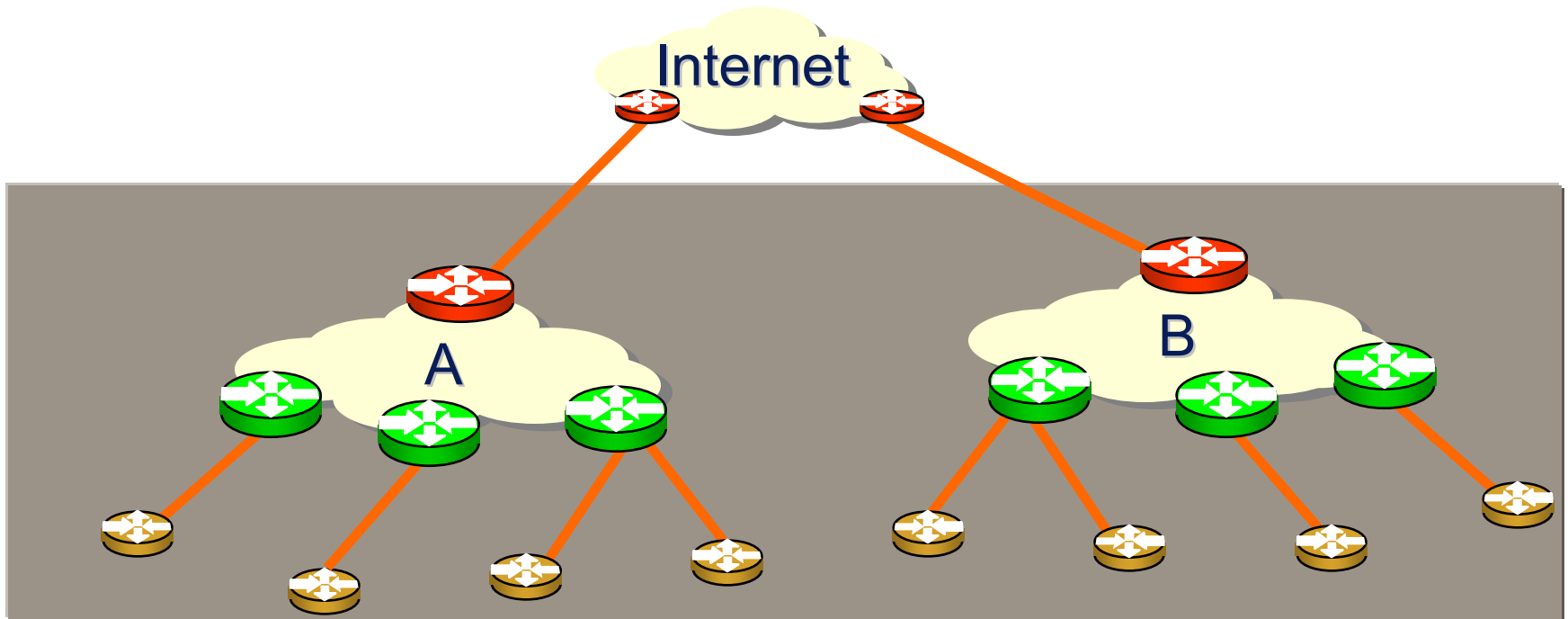- May not be supportable within the size of the available market

Reselling

⌘ For an academic Internet service provider the pressure to resell to service providers will commence on the second day!

⌃ Cost escalation to academic clients through increased volume will be cross-subsidised by higher margins on reselling

Coexistence

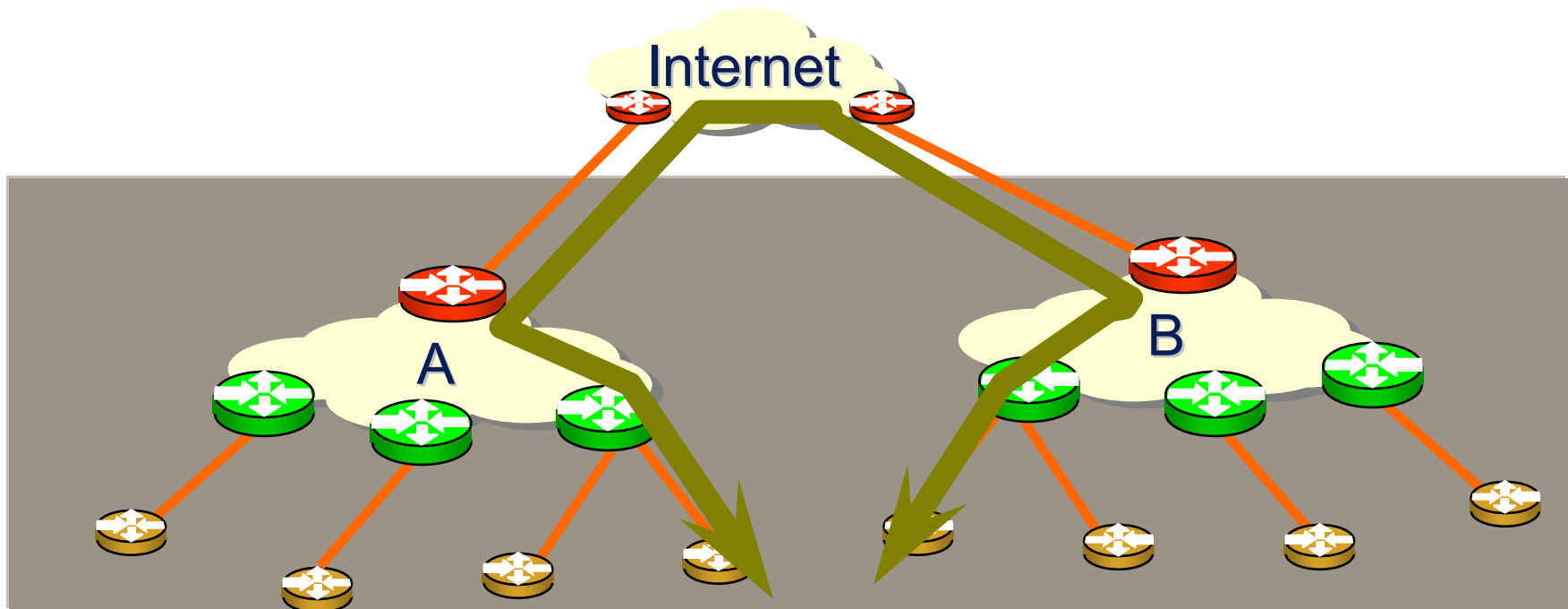- Multiple service providers
- Each with Internet connectivity

Coexistence

- Independent Internet connectivity perceived as marketing advantage
- Allows for Service Provider Operation to operate in a self-determined manner

Independent Coexistence

- Is not cost effective
- Backhaul issue causes cost to both parties

Independent Coexistence

⌘Includes necessary areas of cooperative activity irrespective of link structure

Areas of "Forced" Cooperation

⌘ National delegated namespace (.xx)

- structure of subdomains

- policy of subdomain creation

- inherited subdomain policy constraints

- agreed mode of operation via delegated authority

- accessibility of the domain name space as a prerequisite for Internet promulgation
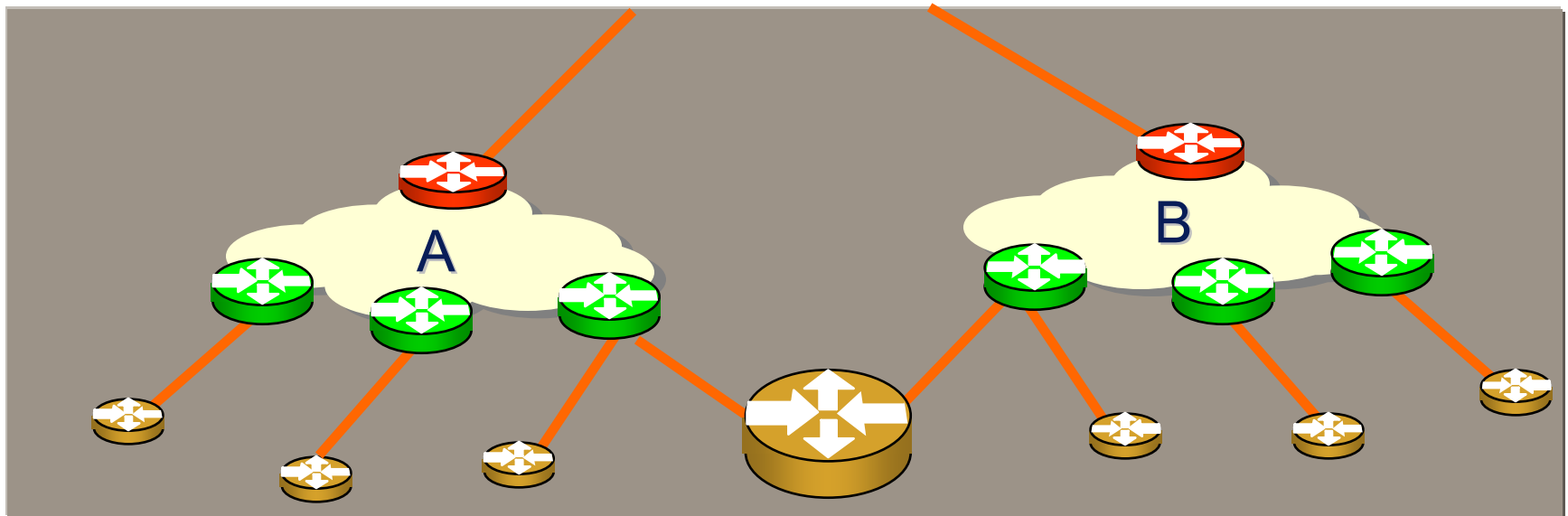
Cooperation (continued)

⌘ Network Address Management

- ⌃ Service Provider Address Block management
- ⌃ Reseller Address Block Management
- ⌃ Customer switching
  - ☒ address switching
  - ☒ name service switching
- ⌃ Reseller switching
  - ☒ address block switching

Cooperation (continued)

- Dual Homed customers
  - routing agreements
    - advertisement to client
    - advertisement to Internet

Cooperation (continued)

- Pricing policies
  - competition vs collusion
- Market domains
  - competition v collusion
- Regulatory Constraints
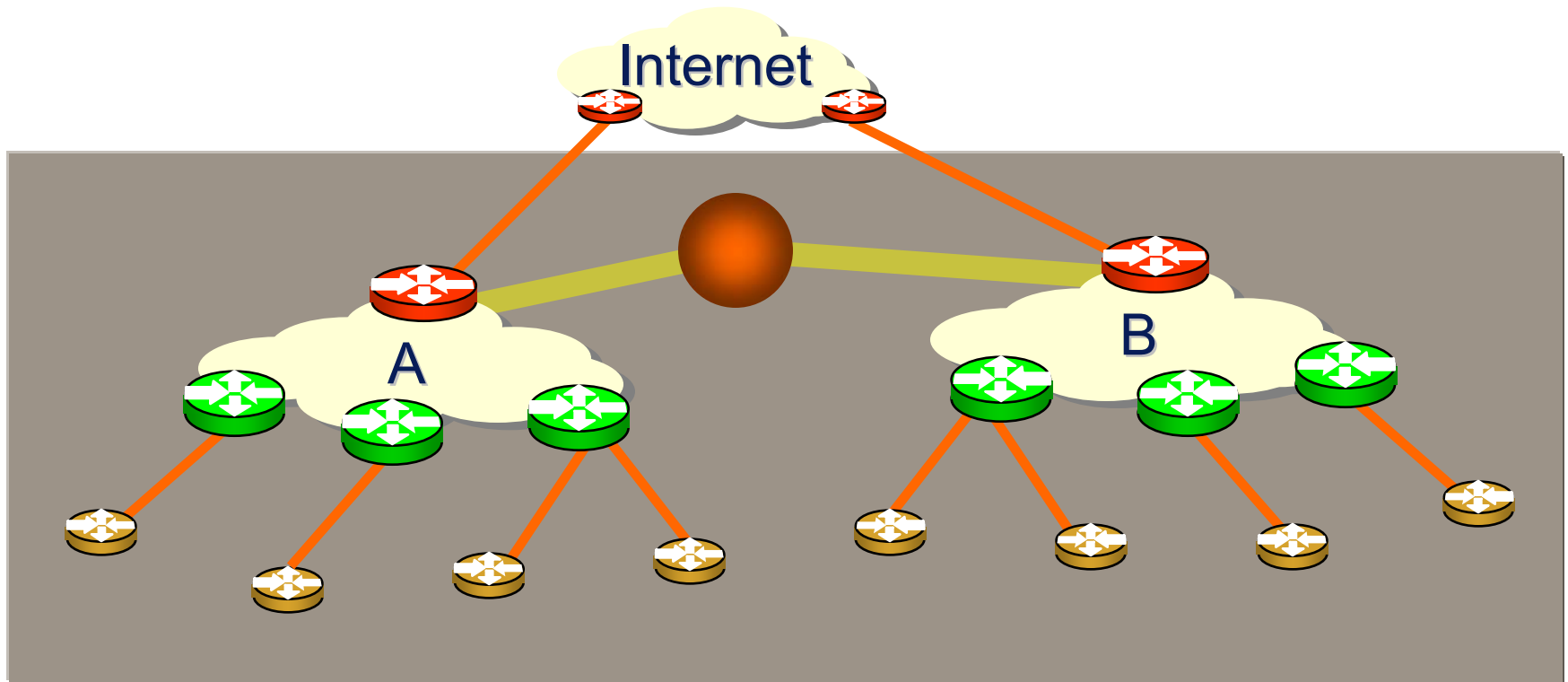 - data service reseller constraints
  - commercial trading constraints

Cooperative Coexistence

- Attempts to rationalise costs to the benefit of all parties
- Can be mutually cost effective
- Can provide mutual failover for increased availability

Cooperative Coexistence

⌘Domestic Interconnection

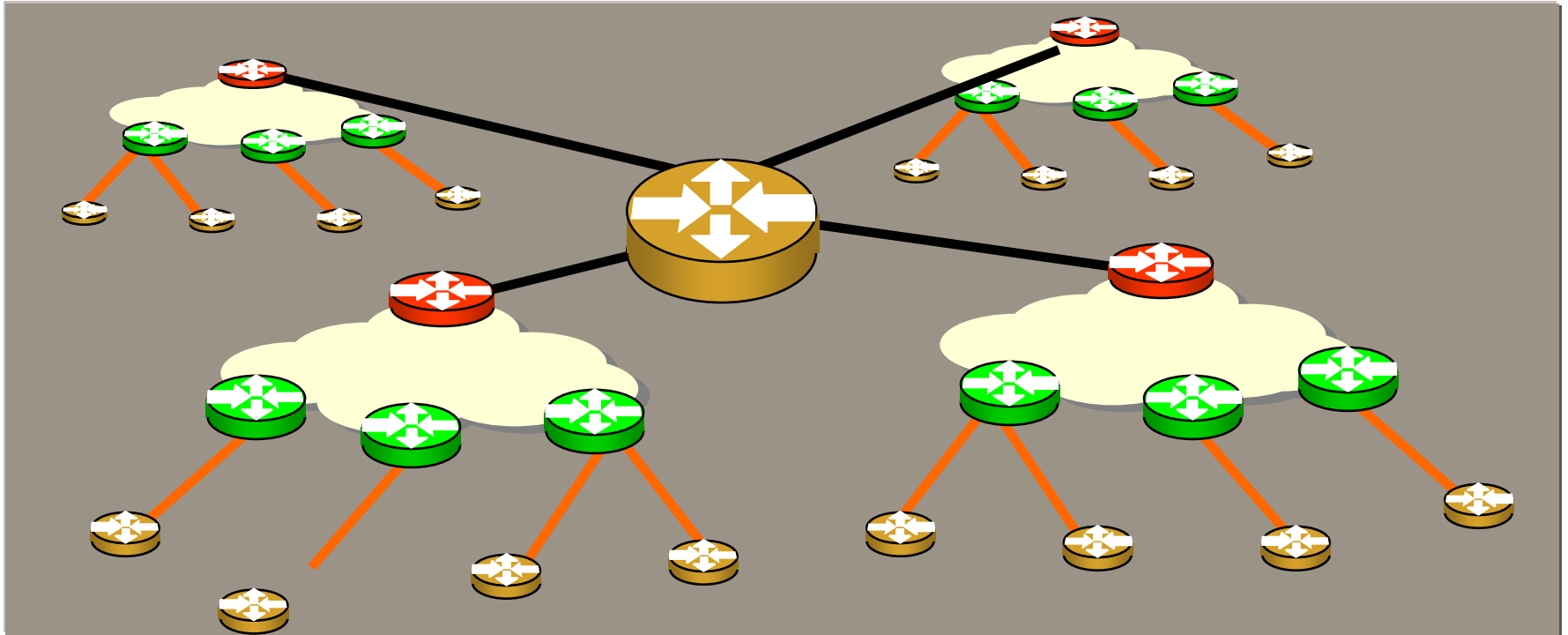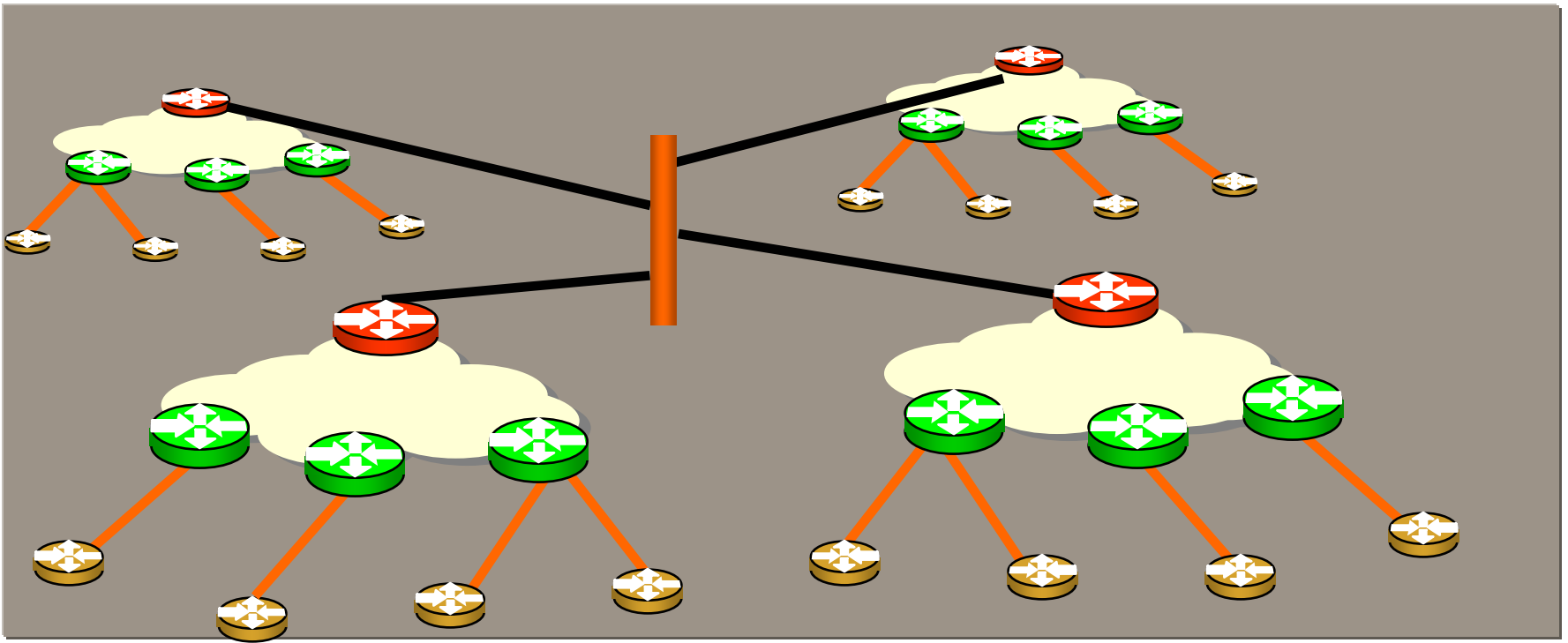# Exchange Structures

⌘Layering

⌃layer 3 models

⊠multilateral policy determination!

Exchange Structures

- layer 2 models (the NAP or IX)
  - unilateral policy capability
  - tailored bilateral policies

Policy Issues

- Client or Peer?
  - Who determines peer status?
  - How?
  - Why?
- How to price peering
  - zero settlement only if equal perceived benefit to each party
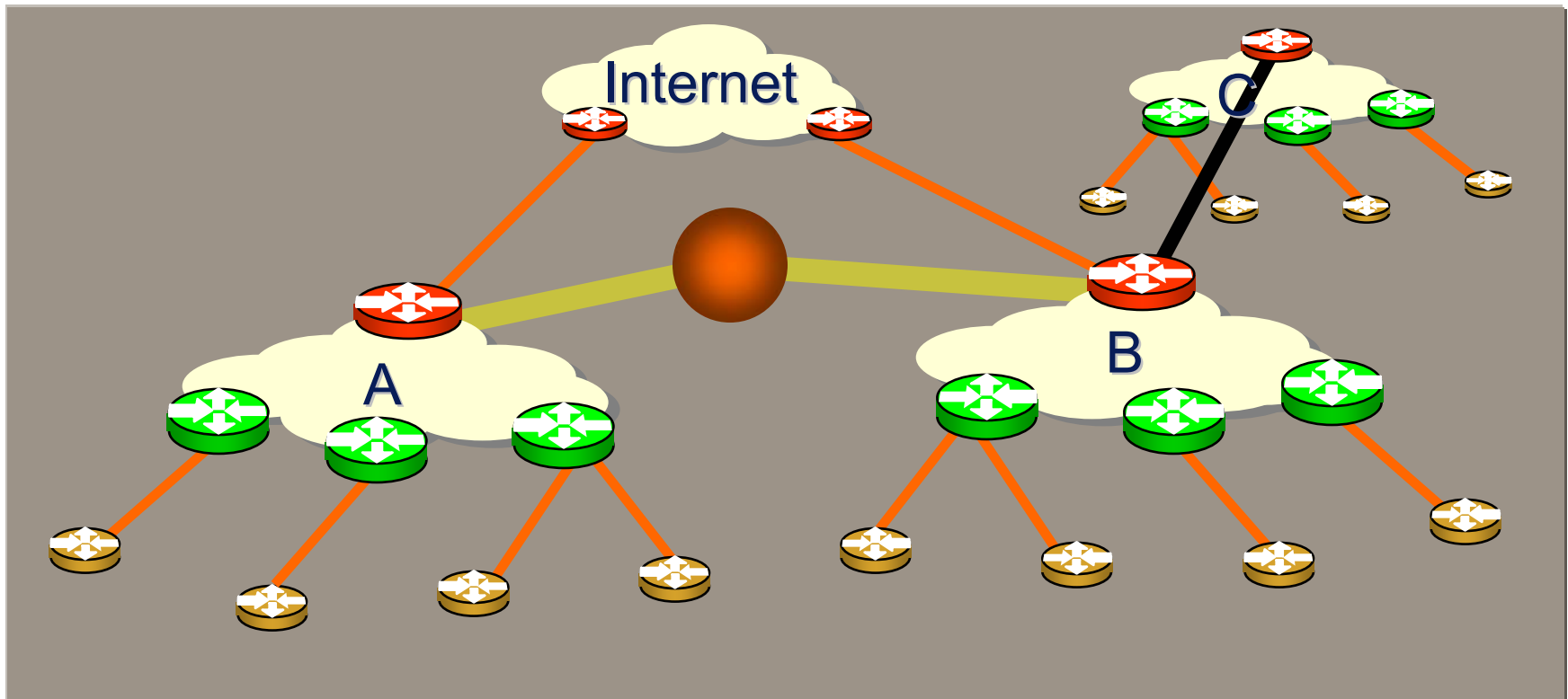
Policy Issues of Peering

⌘ risks
  ⌃ leverage
  ⌃ offloading

⌘ Both parties have to perceive equal benefit in order to peer

Policy Issues

 Who is an indirect party to peering?

   Transit networks

Multiple Providers

⌘Require careful consideration

⌘Require flexibility in approach

Discussion