

# Interconnection and inter-operator access

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# Agenda

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- Basics of interconnection
- What is an interconnection regime?
- Basics of fairness
- Common elements of a fair regime
  - RIO approach
    - Problems with pure RIO
  - Non-discrimination
  - Cost-orientation
    - Internet model?
  - Dispute resolution



# Basics of interconnection

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- Telephony is about calling opportunities
  - Variants apply to Internet, SMS, etc.
- What customers want is the greatest number of opportunities to call and be called (text and be texted, . . . )
- In a multi-operator environment, there can be no competition without interconnection



# Why interconnection is always a problem

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- Assume incumbent has 1000 customers; entrant has 10; not interconnected
  - Calling opportunities (incumbent) = 999
  - Calling opportunities (entrant) = 9
  - Also 999 includes police, hospitals, etc.
    - Bangladesh example: 90% of mobile users cannot call fixed network
  - Whose service would you buy?



# Why interconnection is always a problem

- Now assume interconnection: incumbent has 1000 customers; entrant has 10
  - Calling opportunities (incumbent) = 1009
  - Calling opportunities (entrant) = 1009
  - Both give access to police, hospitals, etc.
- Now there is a possibility of competition on price and quality
- Is this a win-win outcome or one in which entrant gains a lot and the incumbent almost nothing?



# Why interconnection is always a problem

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- If interconnection is mandated, what will the incumbent's responses be?
  - "Incompatible technology; can't do it"
  - "Inadequate capacity; can't do it"
  - "Can do it, but it will take years"
  - "Need to be paid huge amounts, preferably retail+"
  - If all else fails, incentive to compete on congestion: "stay with my service, because the entrant is unreliable"



# The Somalia option

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- No regulatory agency (no government)
- → no interconnection
- Can call within the network or internationally
  - Intra country calls have to come via foreign networks



# What is an interconnection regime

- A set of principles that result in enforceable rules, e.g.,
  - The WTO interconnection principles
    - Definition: Linking with suppliers providing public telecommunications transport networks or services in order to allow the users of one supplier to communicate with users of another supplier and to access services provided by another supplier
    - Interconnection ensured at any technically feasible point: non-discriminatory; timely; cost-oriented; sufficiently unbundled



# What is an interconnection regime

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- The WTO interconnection principles
  - Procedures for interconnection to a major supplier will be public
  - Supplier requesting interconnection from a major supplier will have access to timely dispute resolution from an independent body
- More than 90 countries have made commitments to GATS Protocol 4
  - Around 60 governments bound to regulatory reference paper as a whole




# Basics of fairness

- Many incumbent officials feel strongly that mandatory, non-discriminatory, cost-oriented interconnection is not fair because it allows others to use their network on terms not of the incumbent's choosing
  - In particular that forward looking LRIC methodology understates the costs
- Also, the disproportionate benefits of interconnection (9→1009 v. 999→1009) cause resistance



# Basics of fairness

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- Golden rule: Do unto others as you would have done unto you 
- Appears difficult to apply to interconnection where
  - Costs and conditions vary widely among networks, and
  - Relative positions determine attitudes and approaches to interconnection
    - E.g., Grameen's position on interconnection before and after it became the largest operator



# Basics of fairness

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- Second best: Procedural fairness in the application of core principles
  - Non-discrimination
  - Cost-orientation
  - Dispute resolution satisfying natural justice standards



# Golden rule across religions

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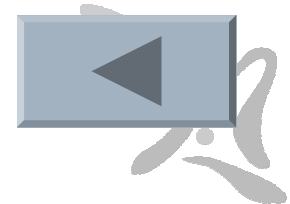
- ❑ **Buddhism:** *Hurt not others in ways that you yourself would find hurtful. Udana-Varga 5,1*
- ❑ **Christianity:** *All things whatsoever ye would that men should do to you, do ye so to them; for this is the law and the prophets. Matthew 7:1*
- ❑ **Confucianism:** *Do not do to others what you would not like yourself. Then there will be no resentment against you, either in the family or in the state. Analects 12:2*



# Golden rule across religions

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- ❑ **Hinduism:** *This is the sum of duty; do naught onto others what you would not have them do unto you. Mahabharata 5,1517*
- ❑ **Islam:** *No one of you is a believer until he desires for his brother that which he desires for himself. Sunnah*
- ❑ **Judaism:** *What is hateful to you, do not do to your fellowman. This is the entire Law; all the rest is commentary. Talmud, Shabbat 3id*



# Keep transaction costs low: RIOs [Reference Interconnection Offers]

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- Most-favored-nation principle in international trade law
  - What you offer to one member of the “club” you have to offer to everyone else
- Reduces negotiation costs and time
  - Also used in labor negotiations in the US
- Also, most importantly, reinforces the non-discrimination principle, of which more will be said



# RIO in TRAI's 2002 regulations

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- RIOs from operators with “significant market power” (over 30% market activity)
  - RIO to be published
  - RIO to be approved by TRAI
- Still possible to negotiate individualized arrangements
- *Model and guidelines* provided by TRAI
  - Payments based on principle of “work done” in originating, transiting & terminating each call



# Elements of a RIO (India)

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- Physical interconnection
- Interconnection usage charge
- Unbundled network element
- Charges for sharing elements
- Charges for other services (billing, directory)
- Applicable technical standards
- Interest rates



# Problems with pure RIO

- Only operators with dominant status bound by RIOs
  - They are compelled to offer interconnection; rates set by commercial negotiation → have to pay non-dominant operators whatever they ask
  - European mobile outcome: 1:20 ratio for M-to-F: F-to-M termination in the 1990s
    - Leads to perverse outcomes, e.g.,
      - Tromboning
      - Credits to mobile customers for calls from Fixed



# Problems with pure RIO

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- ❑ Need to at least have benchmark regulation for non-dominant operators' termination rates
- ❑ Termination market is a “monopoly of one” and will be abused without countervailing power and/or regulation



# “Monopoly of one”

- Voice/text etc. communication comprises
  - Message origination service market
  - Message termination service market
- Same as postal market
  - Easy to introduce competition in origination (different mail collection points)
  - To introduce competition in termination, needed to settle question of “mail box”
    - PO Boxes?
    - Mail box in the house of a mail recipient
  - No question that incumbent does not own “address”



# “Monopoly of one”

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- Who owns the “address” in e-communication?
  - In telephony: operator
  - In Internet: ??
- Unless operator’s hold on “address” is broken, “monopoly of one” will continue
  - Intelligent agents to negotiate access?
  - Multiple numbers and free customer-controlled forwarding?



# Non-discrimination

- Easy to understand principle; derived from the Golden Rule
- Requirements
  - Transparency of how incumbent treats its own traffic and how it treats others' traffic
    - Clear rules, procedures and time requirements
      - Sri Lanka Interconnection Rules of 2003
  - Enforcement: not meeting a time requirement is not a trivial matter
    - Failure of TRC to enforce negotiation requirement by May 12, 2003 led to loss of credibility of the Rules



# Non-discrimination

## □ Requirements

- Do not discriminate between different kinds of traffic if you can help it
  - Sri Lanka fixed-mobile interconnection determination of 1999 gave same termination rates for fixed→fixed and mobile→fixed
  - Part of the problem with the limited mobility controversy in India was the difference in termination rates for mobile and WLL
  - As long as international termination rates > domestic, bypass problems will persist
    - Effort to bring down and move international to parity with domestic in 2003 reforms in Sri Lanka



# Cost-orientation

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- Interconnection is a zero-sum game, at least in the short term
  - The regulator must have a basis for setting the charges
  - Even if the parties agree on rates, they too need a basis
- If not cost, what?
  - Revenue sharing reinforces monopoly mindsets
  - Retail minus can be used in a few instances, where a basis can be found for the minus
    - International origination payments in SL were retail minus, minus being cost of billing, etc.



# Cost-orientation

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- Cost-orientated v. cost-based
  - Why bother with detailed cost studies that contain complex assumptions that will be challenged anyway?
  - Why not use dynamic benchmarks that drive down interconnection costs
    - Denmark: Regulator threatens to intervene unless incumbent keeps interconnection charges among the lowest three in Europe
    - Efficiency = low interconnection charges



# Cost-orientation

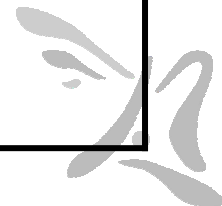
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- What's wrong with sender keeps all
  - Not cost-oriented
  - Does not recognize call termination revenues, creating difficulties
    - In supplying rural areas
    - For ISP dial-up lines
- SKA breaks down as size differentials increase
  - Grameen wanting payments from other mobiles
  - Internet peering → hierarchy



# Interconnection charging, Circuit-switched v IP

Interconnection charge	Circuit-switched network	IP based network
Termination traffic	Charge per min	No charge between networks of the same size Large ISPs charge small ISPs based on the bandwidth of the interconnection link
Transit traffic	Charge per min	Charge based on the bandwidth of the interconnection link
Interconnection link	Cost sharing and causation basis	Smaller IP Networks bear the cost of the link in full



# Problems with Internet interconnection model

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- Higher costs for small networks
  - No distinction between origination and termination; small network also pays to haul traffic from big network
  - Tensions when one network is demoted from peer to client
- Good points
  - Incentives for small networks to collaborate and “bulk up”
    - Possible lessons from Indonesian Internet exchange



# Dispute resolution

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- Have to accept there will be disputes
  - Harvard negotiation techniques difficult to apply because negotiation does not yield non zero sum outcome
- Disputes to be resolved in a timely manner consistent with natural justice principles
  - Both sides heard
  - Judge not biased
  - Based on the record



# Dispute resolution

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- Timely manner
  - All parties, including the regulator, should be time-bound
- Consistency with natural-justice principles
  - Requires an independent regulatory commission (judge not biased)
  - Proper procedures that include both sides being heard
  - A record and a reasoned decision

