Process and Principles for Interconnection rates calculation

by
Werner Neu

Arusha, 15 to 17 April 2002

Agenda

What are Switched Interconnection Services?

What should be regulated?

How to set Prices

Unbundling & Number Portability

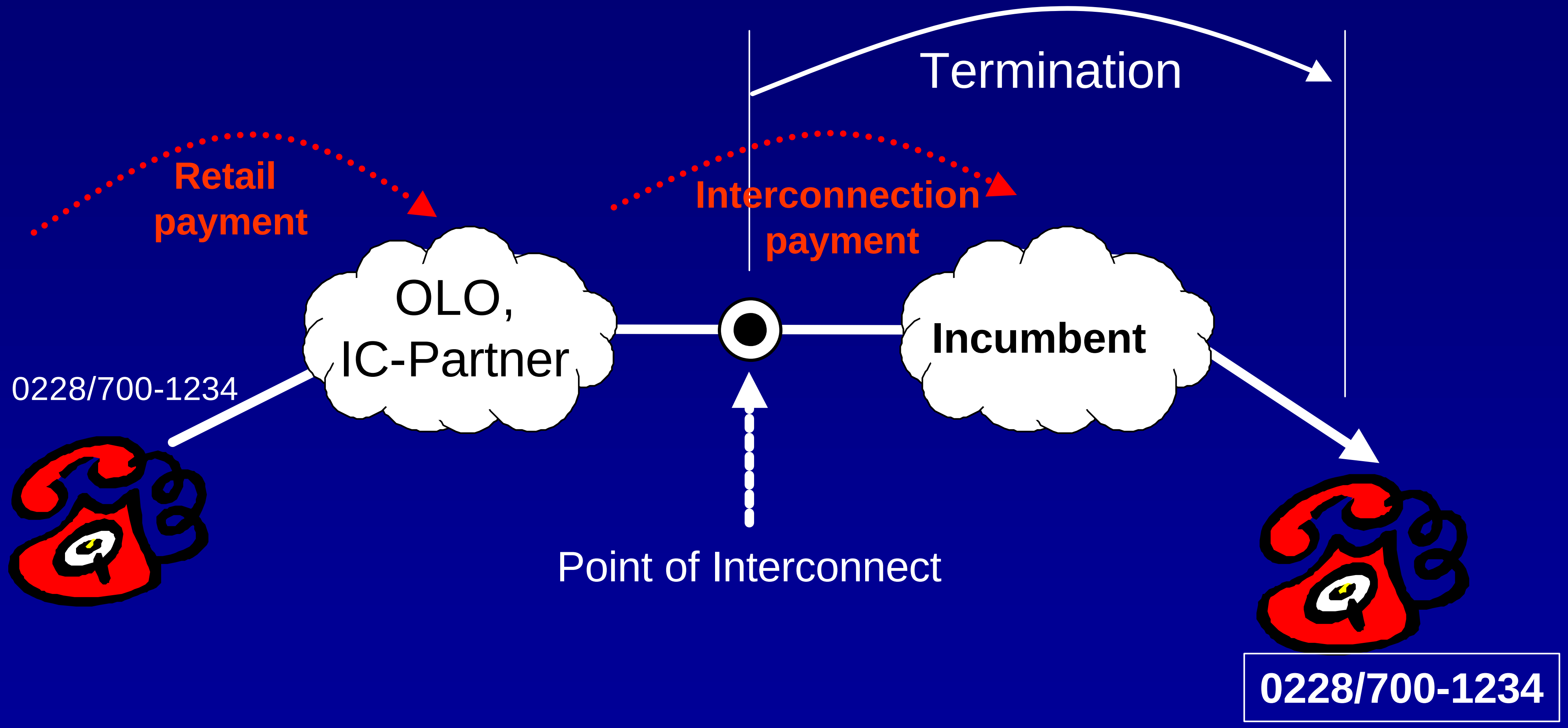
What is interconnection? (1)

- Very generally, interconnection allows that people at two different places anywhere in the world can communicate with each other – across many different networks
- Assures the any-to-any principle in telecommunications
- In a national market being opened to competition, interconnection with existing networks is a necessary condition for newly entering operators to succeed

Basic Services

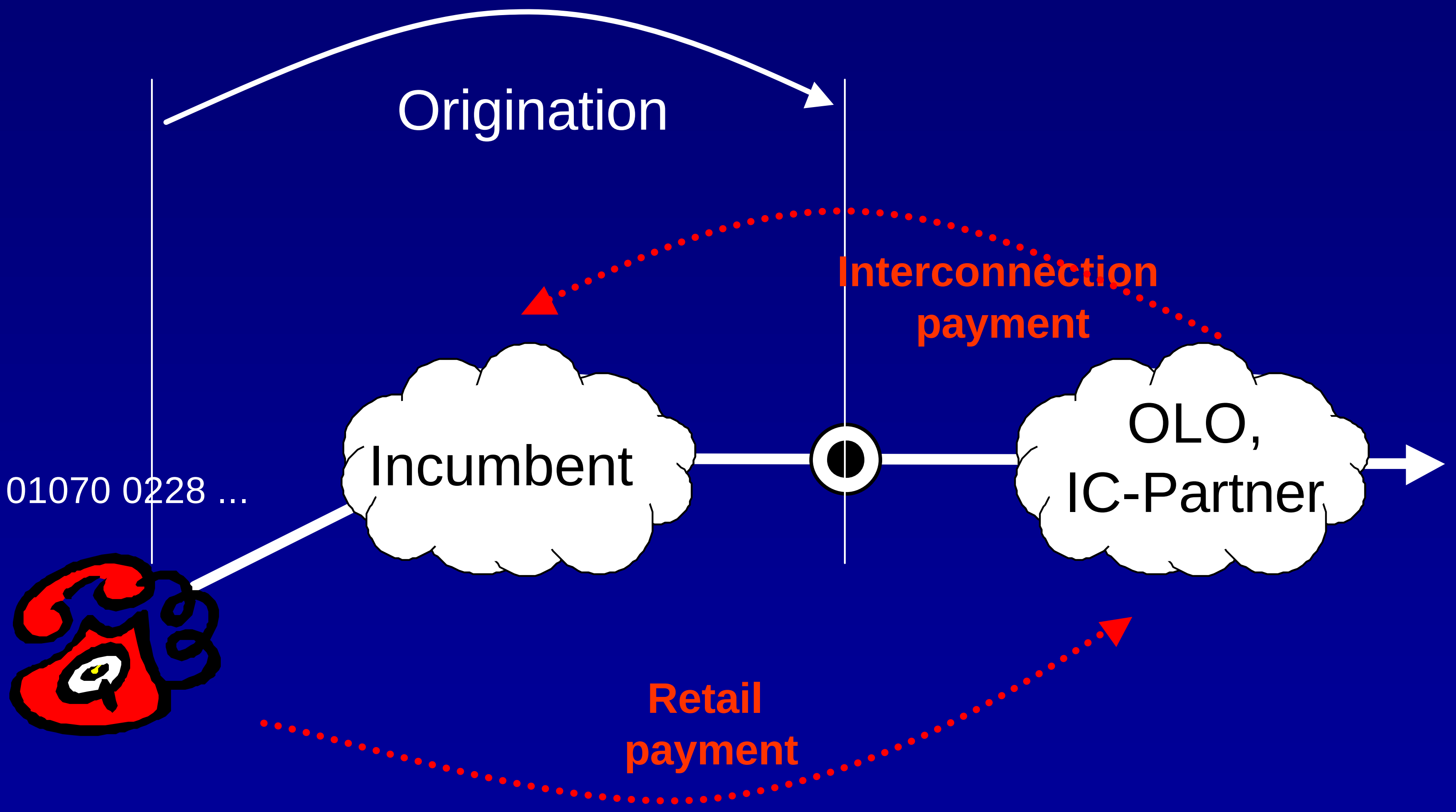
- Principal services
  - Call termination / Call origination / Terminating access
  - Transit services
  - Mobile termination
- Ancillary services:
  - Access to Directory services
  - Access to Emergency services
  - Billing services

Call Termination



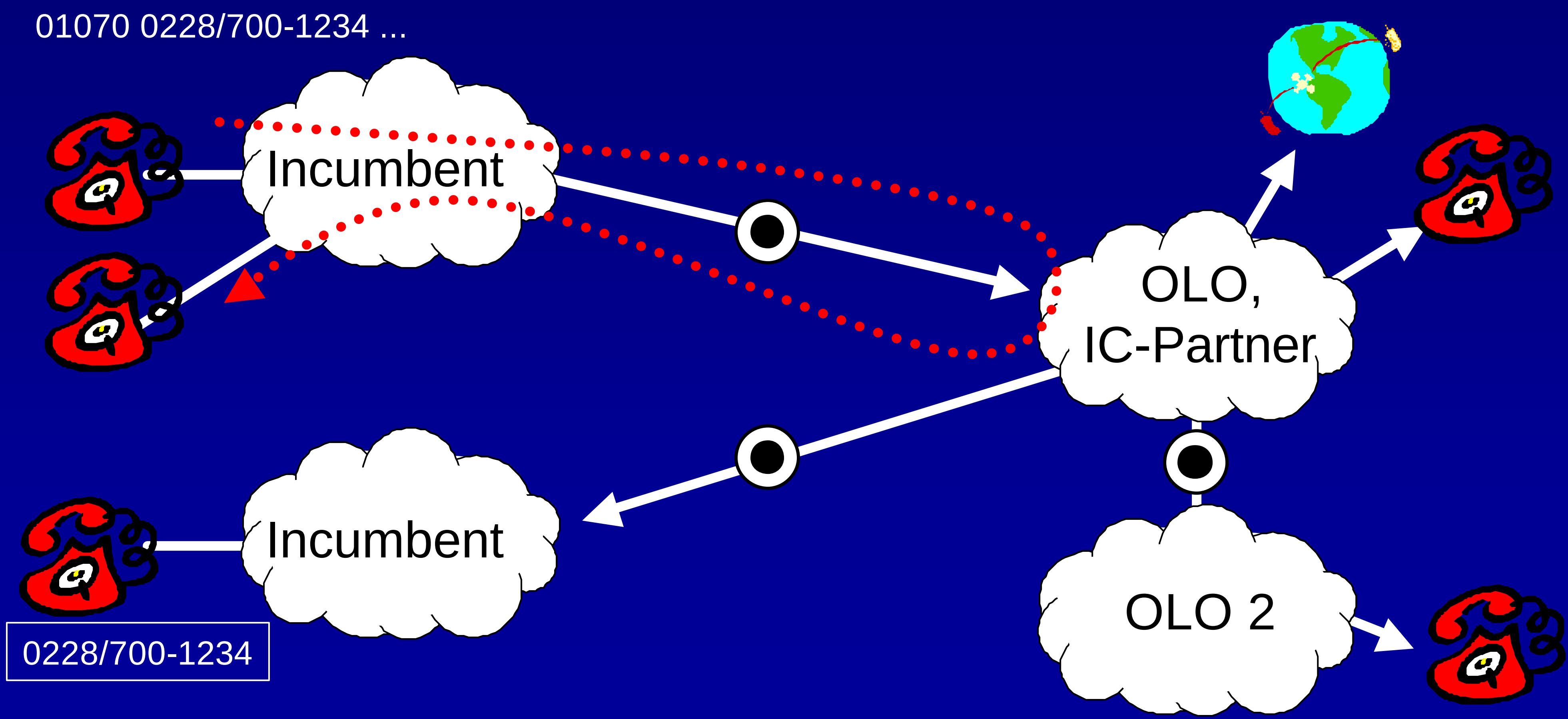
Handover of the call <u>close to the destination</u>

Call Origination (Carrier Selection)

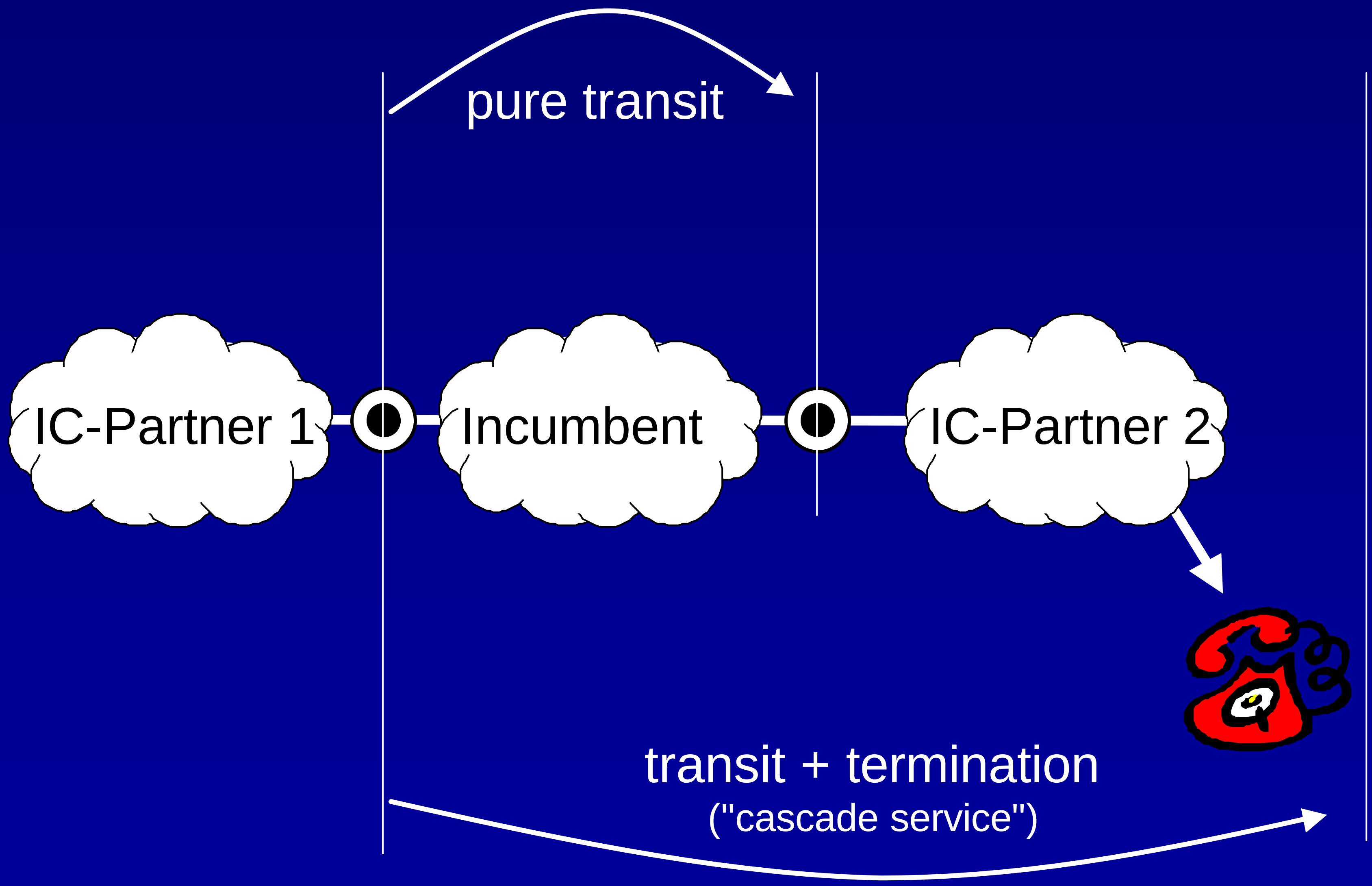


Handover of the call close to the origin

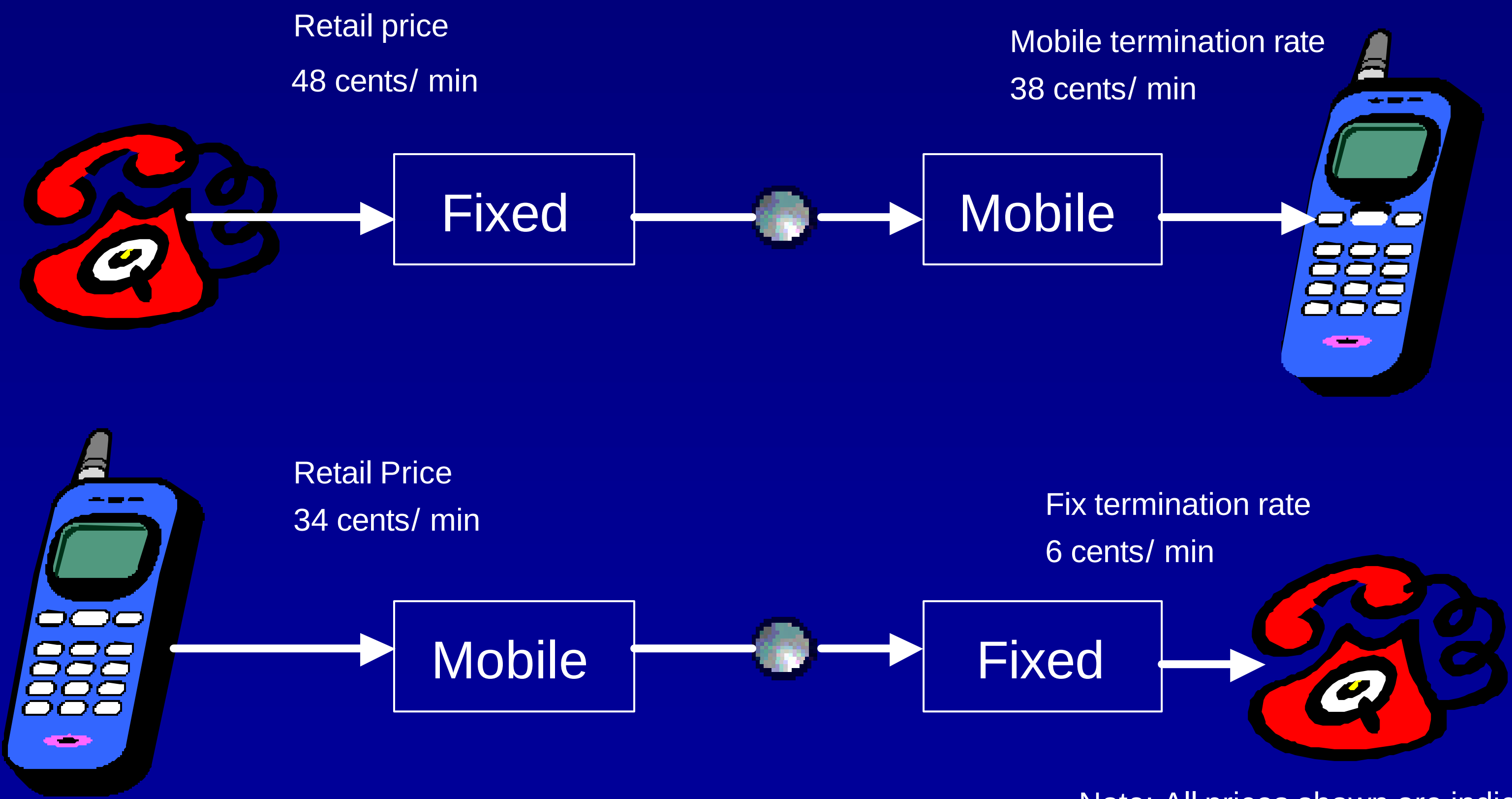
Carrier Selection & Call Termination



Transit Services



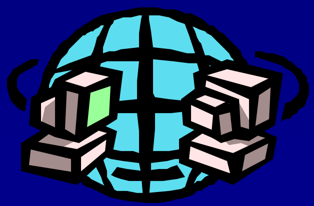
Fixed to Mobile and Mobile to Fixed

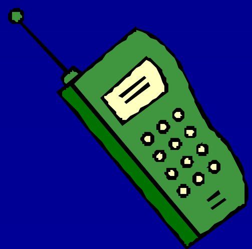


Note: All prices shown are indicative only

Generally, mobile termination rates are above fixed termination rates

Other Interconnection Services



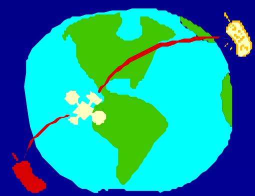


- Emergency Calls
- Number Translation Services (e.g. Freephone, Shared Cost, Premium Rate, Personal Number)
- Internet Access
- International Interconnection
- Mobile Termination
- Third Party Billing

0800

0900

0700



Agenda

What are Switched Interconnection Services?

What should be regulated?

How to set Prices

Unbundling & Number Portability

Numerous Regulatory Issues arise when ensuring the shared Use of Resources, the most controversial one being Pricing

Shared Use of Resources

Interconnection

- P.o.I.
- I. billing
- IC at local level
- I. routing. ....

- product scope
- pricing
- cost standards
- role of negotiations
- role of regulator

Unbundling Local Loop

- degree
- co-location
- site sharing
- air conditioning
- fault repair, ventilation
- information requests
- ....

Other License obligations

- number portability
- 3rd party billing
- payment collection
- carrier pre-selection
- tariff rebalancing
- ....

Which Services to be Regulated?

- General rule: Only those services shall be regulated which constitute an „essential facility“
- Essential facilities are basically characterised by the following:
    - They are essential for the interconnecting party to provide their services and
    - they can not be provided by any party besides the owner of the essential facility under reasonable terms (within reasonable time, under reasonable costs). Termination services generally qualify as such services

Guidelines for Negotiations

- In general, interconnection agreements between operators without SMP should be freely negotiable
- Nevertheless, it is necessary to define general guidelines as the public interest is concerned in any case

Guidelines for Negotiations: Interconnection Agreement

- Each interconnection agreement shall contain mutual obligations and responsibilities to protect interests of users

- Each operator should be required to negotiate in good faith:
  - ⇨ **no intentional misleading**
  - ⇨ **no coercion into making an agreement**
  - ⇨ **no intentional obstruction**

Rights of the Regulator

- right to intervene in negotiations on its own initiative or on request by either party
- right to set time limits for negotiations
- right to inspect agreements in the sphere of the public telecommunications network (PTN)
- right to require a PTN operator to provide interconnection to its facilities

Guidelines for Negotiations of SMP Operators (1)

- The SMP operators should be obliged to
  - **meet all reasonable requests for access to its network**
  - **adhere to the principle of non-discrimination**
  - **make available the agreements concluded to the MCI and on request to interested parties (except confidential parts)**
  - **publish a standard interconnect offer**

Guidelines for Negotiations of SMP Operators (2)

- Components of a standard interconnect offer
  - Call termination (local, single-tandem, inter-tandem)
  - Transit calls (single, inter-tandem)
  - International outgoing calls
  - Physical collocation interconnect and handover
  - Customer-sited interconnect and handover
  - Ancillary and advanced services, e.g.
    - Operator assistance
    - Directory services
    - Emergency services
    - Billing services

Reference Interconnection Offer (RIO) by Major Network Operator

- The obligation to publish their interconnection offer or to make a reference interconnection offer (RIO) can help to prevent the incumbent from playing off one competitor against another.
- For example, according to the Annual ITU Telecommunication Regulatory Survey, about 50 countries make interconnection agreements publicly available, such as Canada, over the internet.
- Some mechanism should be in place to protect commercial confidential information in interconnection agreements, (e.g. confidential annexes can be separated out).

Transparency and Information Required

- The availability of points of interconnection should be indicated in the Reference Interconnect Agreement to be published by the Incumbent.

- Regulator should ensure that interconnection is available and that all necessary information is furnished by the operator, e.g.
  - POI location with exchange type and address,
  - description of network facilities to be interconnected,
  - specific capacity and traffic volume requirements,
  - definition which party has to provide which facility,
  - other technical specifications, e.g. calling line identification specifications
  - Information should also include signalling interconnection, e.g. type of standard, point codes, use of leased lines, diagram of signalling interconnection architecture

Points of Interconnection (POIs) at Any Technically Feasible Point

- General rule: incumbent shall permit interconnection at any technically feasible point : local switching level (local interconnection), tandem switching level (single tandem interconnection) and trunk connection (double tandem interconnection)
- France: competitors required to establish a POI in each of the country's 18 local government jurisdictions.
- Spain non-facility based competitors have to maintain a POI in each of the 52 provinces in which they originate traffic.
- In Germany, competitors must open a new POI once their traffic at any existing POI exceeds a certain capacity threshold (48,8 Erlang)

Requirements for Geographic Roll-Out of POIs

- Some interconnection regimes require minimum number of points of interconnect, e.g.
  - to receive a licence
  - to be able to offer country-wide services
  - to fulfill requirements of network integrity of the incumbent's network
- The number of POI determines the cost structure
  - low number of POI => low set-up costs (for own network), in average high per-minute charges
    - high number of POI => higher set-up costs (for own network, leased lines, etc.), decreasing average per-minute charges

When Shall the Regulator Step in?

- Some countries favoured a policy of industry negotiations of interconnection agreements, operators may seek dispute regulations, if negotiations fail.
- Growing consensus: advance regulatory guidelines better suited to establish the proper environment for interconnection.
- International experiences: lack of advance regulatory guidelines hinders development of competition, delaying the introduction of competition.
- In many countries interconnect terms and conditions and charges with SMP are subject to ex-ante regulation (approval or establishment by the Regulator)
- Otherwise dominant operators may be tempted to set charges and conditions which are disadvantageous
- Ex-ante regulation of charges for operators with SMP reduces time to reach a fair agreement.

Guidelines for Dispute Resolution

- When no agreement on interconnection is brought about, either party may appeal to the MCI for dispute resolution.
- The MCI has the right to refuse when none of the operators has SMP.
- In any other case the Regulator shall decide on the dispute within a period of eight weeks. This period may be extended by a maximum of four weeks.
- The Regulator shall
  - take into consideration the interests of the users and the entrepreneurial freedom of the operators to configure their networks
  - decide on the basis of public oral proceedings
  - give the parties concerned and business circles affected the opportunity to state their case

Guidelines for Dispute Resolution (2)

- The decision of the Regulator has to be substantiated and published.
- The Regulator may backdate any determination to remove an incentive for delaying tactics.
- The operators shall comply with the decision of the Regulator within a period not exceeding a predetermined period (e.g. 12 weeks).
- The operators may take case to a court of appeal within a period not exceeding a predetermined period (e.g. 4 weeks). Such appeal shall not have suspensory effect.

Agenda

What are Switched Interconnection Services?

What should be regulated?

How to set Prices

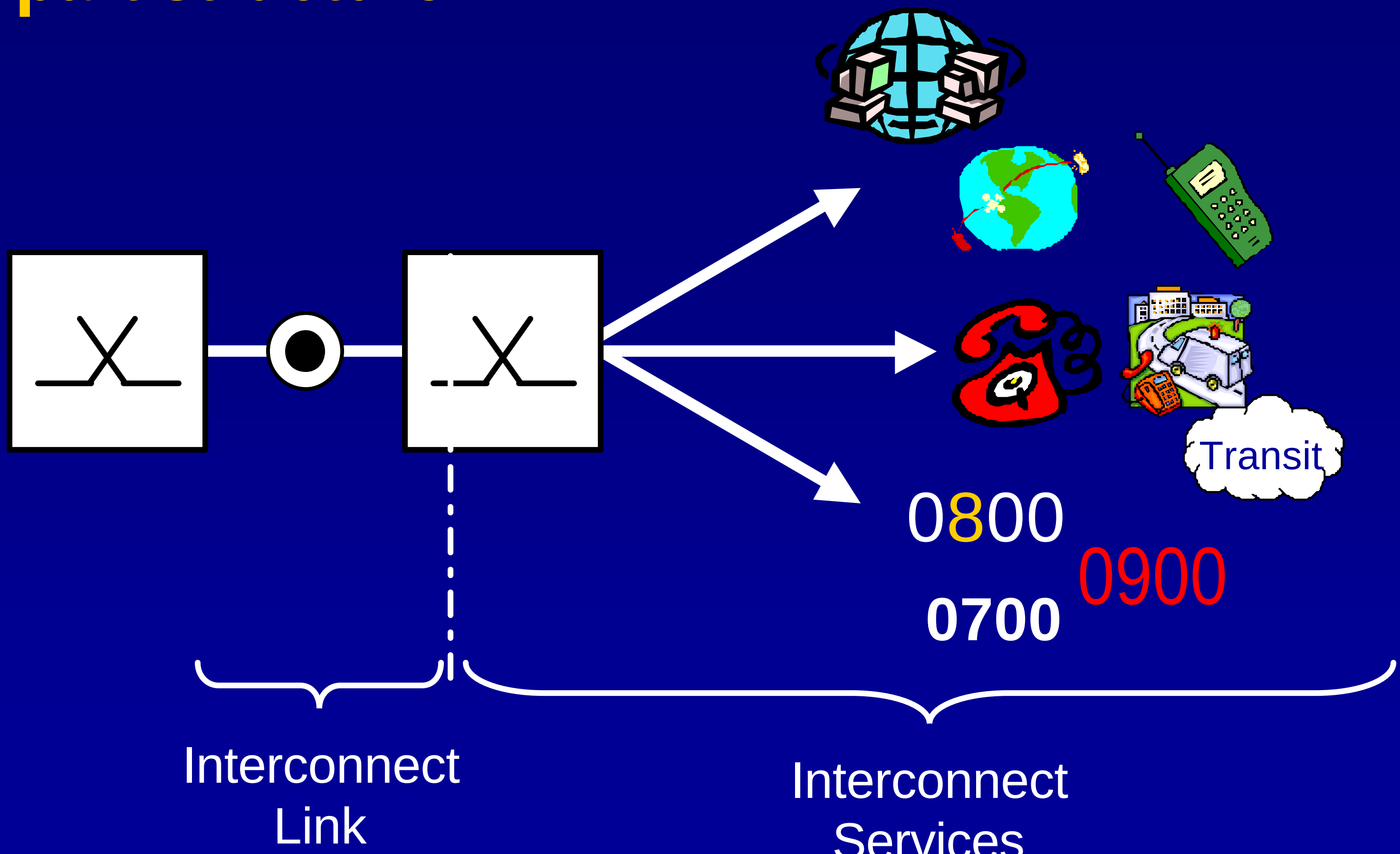
Unbundling & Number Portability

Methods of Determining Interconnection Charges

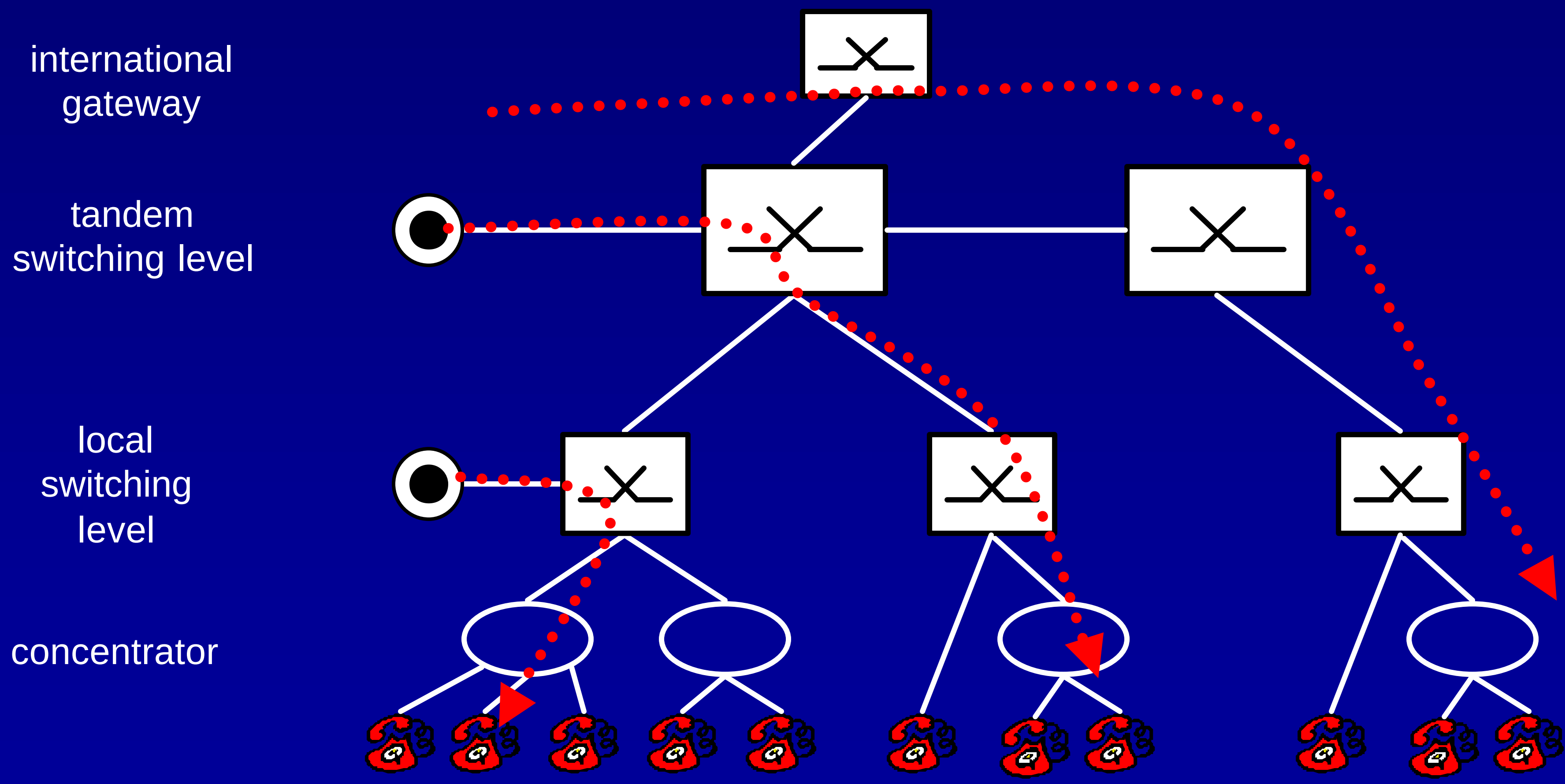
- Cost based
  - Long Run Incremental Cost Accounting Method (LRIC)
  - Fully Distributed Cost accounting methodology (FDC)

- Others
  - Revenue Sharing
  - Bill and keep
  - Retail minus
  - Benchmarking

Pricing of Interconnection
- Two part structure -

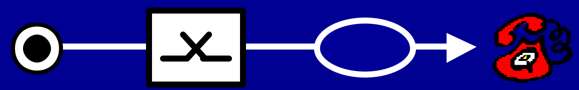


Pricing of Interconnection Services
- Determined by network structure -

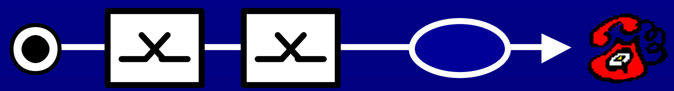


Pricing of Interconnection Services
- Element based charging (EBC) -

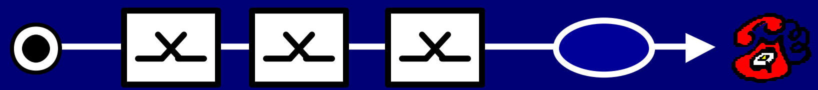
- Definition of Service by network elements
  - ⇨ local interconnection



  - ⇨ single tandem interconnection



  - ⇨ double tandem interconnection



Pricing Interconnection Network Services :
Based on costs from a bottom-up model

Identify fundamental cost drivers of networks

- coverage (geographical extent of the network)

network's capa-pacity to handle

- traffic
- customers

Cost of network components

- physical items of equipment
- directly related operational / maintenance costs

Annuitisation of costs

- purchase value
- cost of capital
- price trend
- asset life

Allocation of component costs to network services

- map network elements to network services via routing table
- divide annualised costs by volume

Mark ups

- operational costs
- product / supply costs
- common costs
- externalities

Cost of particular product

- customers
- incoming minutes
- outgoing minutes (on-net / off-net)
- etc......

Pricing Interconnection Networks Services :
Determining the costs of network components

number of physical units of all network elements
(concentrators, local switches, single and double tandem switches, transmission links)

capital and operating costs of network elements
(installation etc.)

capacity of network elements
(busy hour erlangs, call attempts etc.)

unit costs of every network element
(dividing costs by traffic)

Pricing Interconnection Network Services : Pros and cons of bottom-up LRIC models

+

- suited for modelling forward-looking (long run) costs
- reflects complex linkages
- offers a rather detailed view of (hypothetical efficient) cost structures
- no dependency on cost calculation system of the company subject to regulation
- most effective when existing network structure is considered to be inefficient

-

- different views about efficient network
- lack of transparency and difficult to implement
- arbitrary as to determination of essential input parameters
- variety of forecasting and modelling assumptions (equipment design utilisations, future asset prices, future voice and data volumes) leads to high uncertainty about results
- sensitivity analyses demonstrate that, depending on the data for structural parameters, prices may vary significantly

Pricing Interconnection Network Services :
Based on costs from a top-down model

Traditional business structure is based on functional area (sales and marketing, planning, operation etc.)

Product cost data not available from normal accounts systems (which is cost centre based)

Need to allocate accounts-based data fully to products and services

After allocation, costs are contained in 1) products, 2) network elements, 3) related functions and 4) other functions

Top-Down Models:
Implementing a suitable cost accounting system

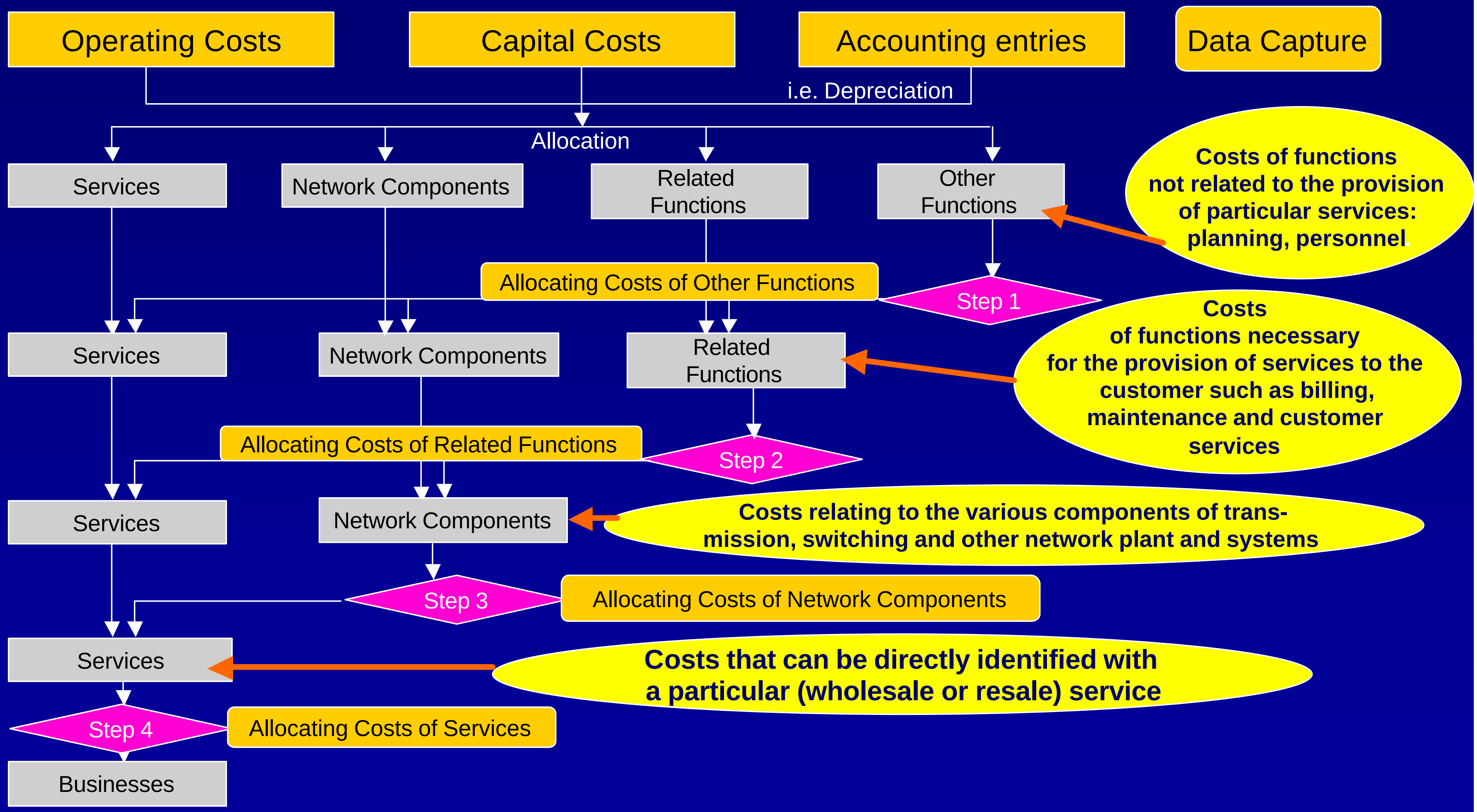
Objective

- to follow the basic principles of cost orientation and transparency
- to prevent discriminatory behaviour such as cross-subsidisation

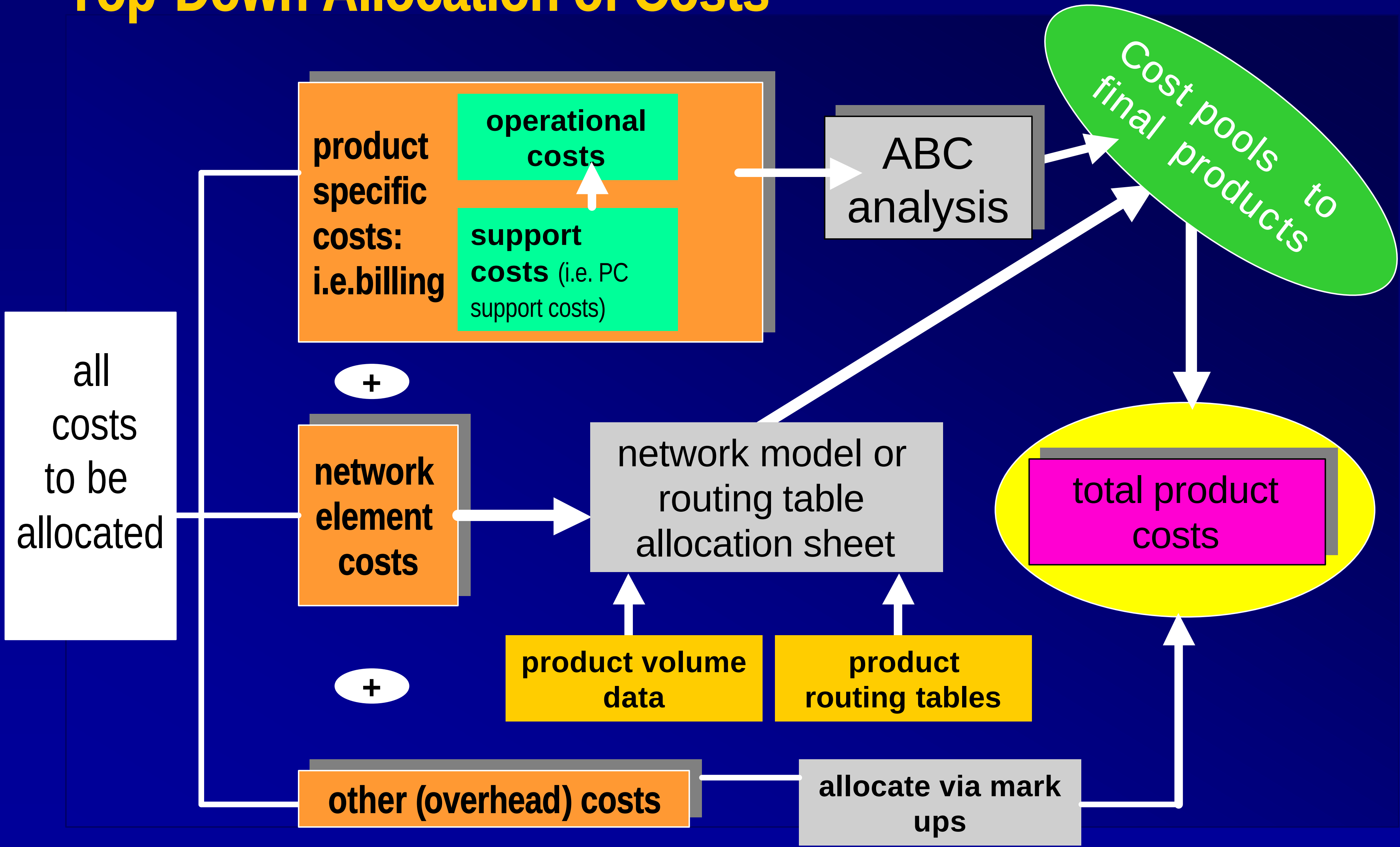
Requirements to dominant operator

- keep separate accounts of
  - telecommunication activities and other activities
  - regulated and un-regulated activities
  - each activity that is subject to regulation
- allocate costs, capital employed and revenue in accordance with principle of (direct or indirect) cost causation (i.e. ABC) (at least 90%)
- clearly identify unattributable costs in a specific account

Accounting Separation: Allocation of Costs

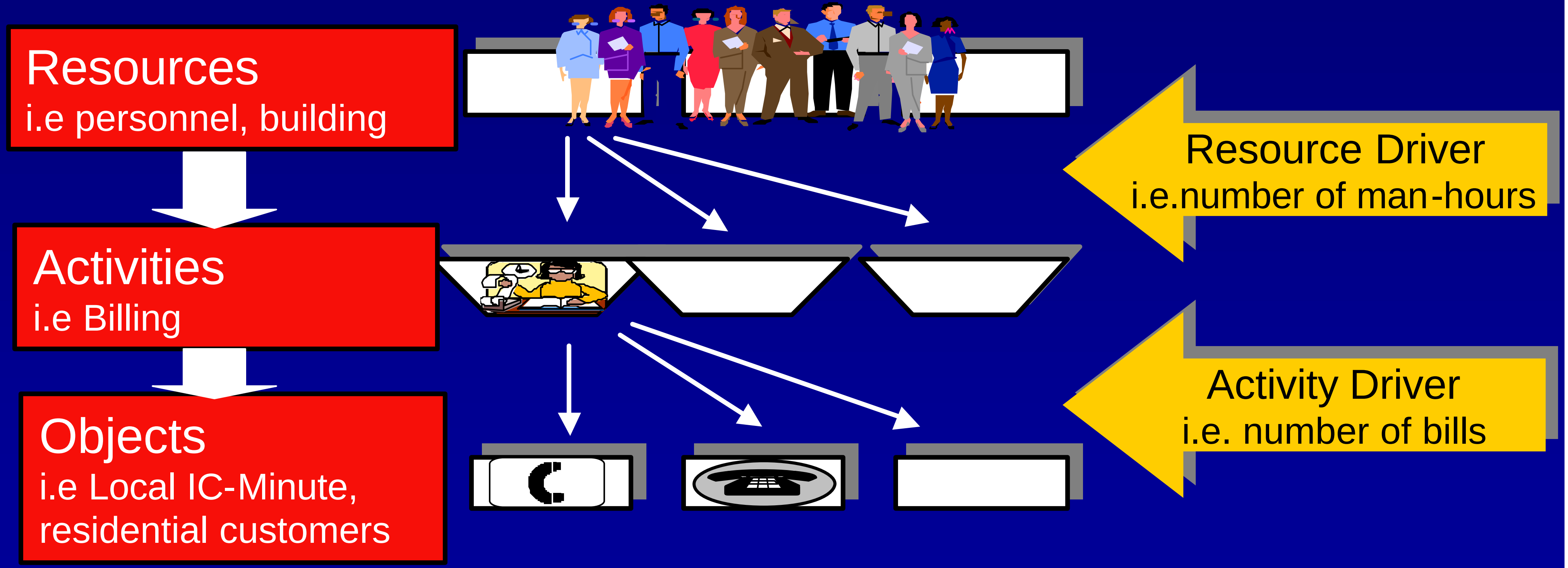


Top-Down Allocation of Costs



Activity Based Costing Principles are Fundamental to Any Top-Down Model

The ABC-Model attributes resources to activities and finally to services



➔ **As to cost assignment the focus is on <u>why</u> and <u>what</u> consumes costs, rather than how to allocate costs that have already been occurred**

Interconnection Charges: Revenue Sharing

- **Entrant pays incumbent share of his revenues as compensation**
- **Operated in countries with limited competition or protected monopolies, e.g. Thailand, Indonesia, China, Russia, Nigeria before privatisation.**
  - ⇨ easy to implement; No further cost studies have to be made,
  - ⇨ payments can easily be calculated on the basis of call records.
  - ⇨ Payments are not connected to the costs, no indication whether the incumbent is over- or undercompensated.
  - ⇨ Worst case: interconnect agreements contains clauses for retail tariffs, e.g. condition that new entrants tariffs have to be based on incumbents tariffs.
  - ⇨ New entrant not able to compete on basis of prices; competition will be limited only to niche markets where people are willing to pay a higher price, e.g. because no service otherwise.
- **For incumbent, model is very favourable: receives additional revenues and widens the subscriber base without own expenses.**
- **For a country that wants to liberalise markets and that regards competition as the major driver for market growth and innovation, revenue sharing is not recommended.**

Interconnection Charges: Bill & Keep

- Simple methodology: Operators do not pay each other for termination. Bill own customers only & keeps revenues. Each operator pays own facilities.
- If more calls are terminated in the incumbent network, new operators have an advantage
- Approach is applied in Canada, Mexico and some States in the USA.
  - Simple model; fits good with balanced traffic flows. With Unbalanced traffic flows it favours smaller operators & supports new competitors.
  - Recommended with flat rate regimes or below-cost local call charges: cost based tariffs would imply IC charges above retail tariffs
  - With Unbalanced traffic flows disadvatage for operators with higher traffic. Bill and keep does not reflect the cost of interconnection.
- Bill and keep is a simple and easy to implement instrument. Works best with similar traffic flows & cost structures.
- Appropriate to promote competition if retail tariffs are below cost or where flat rate are applied, e.g. for local calls or homogeneous data networks.

Interconnection Charges: Retail Minus

- IC rates = retail tariffs minus x percent. Discount can reflect avoided cost, e.g. for billing or marketing.
- Retail minus was used in US and Japan before1995.
  - ⇨ Comparably easy to calculate. Ensures compensation for interconnection ensures ability to compete also on prices.
  - ⇨ Calculation can never be exact. Danger of over- or undercompensation.
  - ⇨ If retail tariffs are below cost incumbents will be under-compensated.
  - ⇨ Retail plus approach is even worse: the same estimation problems and negative effects for competition.
- Retail minus can serve as a quick proxy if decisions have to be made quickly and for the transition period until information about interconnection costs are available.
- Retail minus mechanism should not prevail for a longer time because of its weakness to assess the right amount of discount to be provided.

Interconnection Charges: Benchmarking

- Applied in some member states of the EU, e.g. in Denmark.
- European Commission has undertaken research on tariffs for interconnection and defined „best practice“ of the best three countries.
- Member states are requested to near their interconnection tariffs to the best practice benchmark.
  - Benchmarking can deliver a range of tariffs within which interconnection charges should be set.
  - Can also be used to cross-check results from cost based tariff calculation.
  - Works well in environments where interconnection charges are sufficiently comparable, e.g. where network and charging structures are sufficiently homogeneous.
  - The problem of benchmarks is that the respective costs of services have to be comparable. Challenge is to make information comparable and to account for differences
  - They can also deliver targets from best practice countries or “worst practice” examples,

Interconnection Charges: Benchmarking - IC tariffs in the European Union