

Telecommunications Network Interconnection in Hong Kong

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Background

- Hong Kong has a fully open and very competitive telecom market
- Competition of domestic fixed network market began in 1995 with the introduction of 3 new entrants to compete with the incumbent operator
- Market became fully liberalised from Jan 2003 with no limits on the number of fixed network licences to be issued

Significance of Interconnection

- Interconnection allows users of one network to communicate with users of other networks
- The vital prerequisite for a liberalized and competitive telecom market

Licensing & Regulatory Issues

- General Condition 13 of Fixed Carrier Licence/FTNS licence specifies the requirements for interconnection
- Section 36A of the Telecommunications Ordinance (Cap. 106) empower TA to make a determination under Section 36A whenever there is a dispute on interconnection charges between any two FTNS operators

Licensing & Regulatory Issues

- In brief, the TA may appoint an "Interconnection Determination Committee" (IDC) to consider the request for determination, including the written request to the TA, details of the negotiations and proposed agreements from the parties involved
- Members of the Committee shall consist of government staff (from OFTA and other government departments) and when necessary, outside experts/consultants

Hong Kong's Regulatory Approach on Interconnection

- Interconnection configuration is divided into two main types according to the different physical modes of interconnection
 - (a) Type I - Interconnection between Network Gateways
 - (b) Type II - Interconnection at Points in the Local Loop
- Telecommunications Authority (TA) issued Statement No. 7 on “Carrier-to-Carrier Charging Principles” which details interconnection arrangements

Hong Kong's Regulatory approach on Interconnection

- Hong Kong adopted a light-handed, market driven regulatory approach
- Interconnection is mandated as licensing conditions for fixed network operators (FNO)
- Interconnect issue should be negotiated commercially in the first instance. But when negotiations fails, TA may intervene

Dispute Resolutions

- Mediation
 - TA would be prepared to facilitate negotiations by way of conciliation and mediation, without formal intervention
 - Commercially negotiated arrangements are considered more sustainable than those imposed by determination

Dispute Resolutions

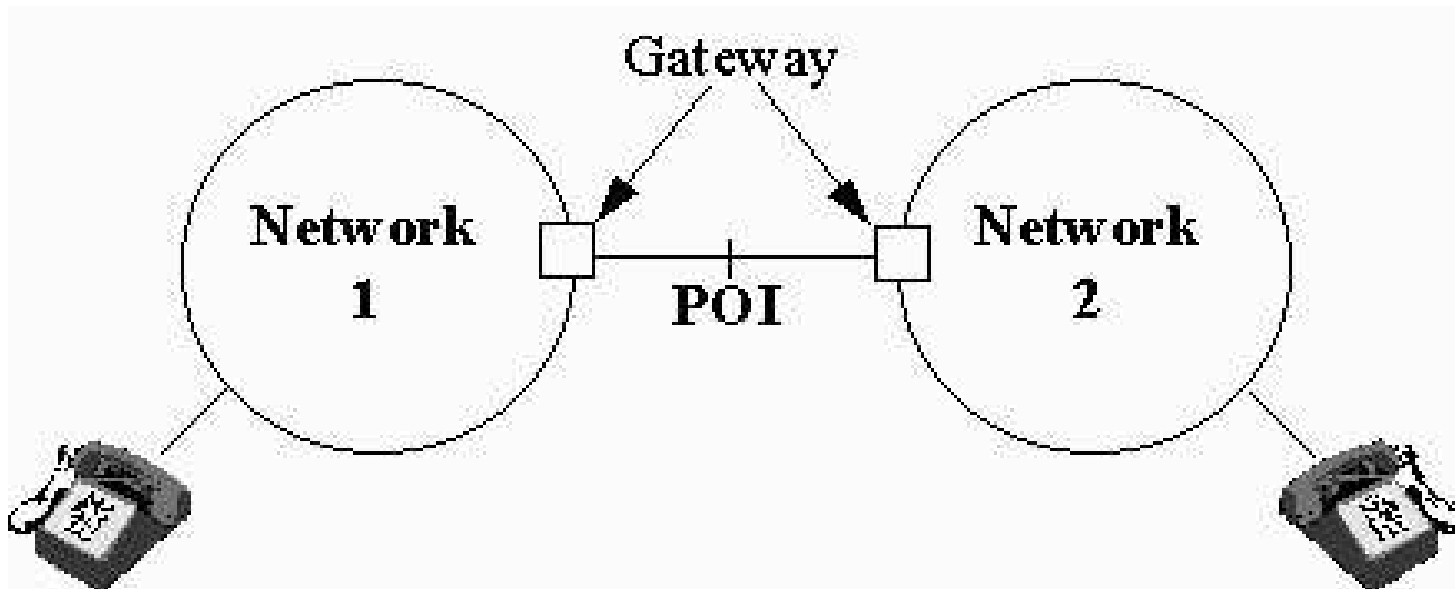
- **Determination by TA**
 - TA appoints an IDC to consider upon the request for determination
 - All the relevant parties will be given chances to make representation

Dispute Resolutions

- **Determination by TA (Cont'd)**
 - The IDC will recommend to the TA, considering the economic and social benefit, regulatory implications, efforts made by parties to secure an agreement, chance of an agreement without intervention, and the consequence of non-intervention
 - The TA makes his decision accordingly and Section 36(B) allows the TA to issue directions to licensees for them to comply with determination

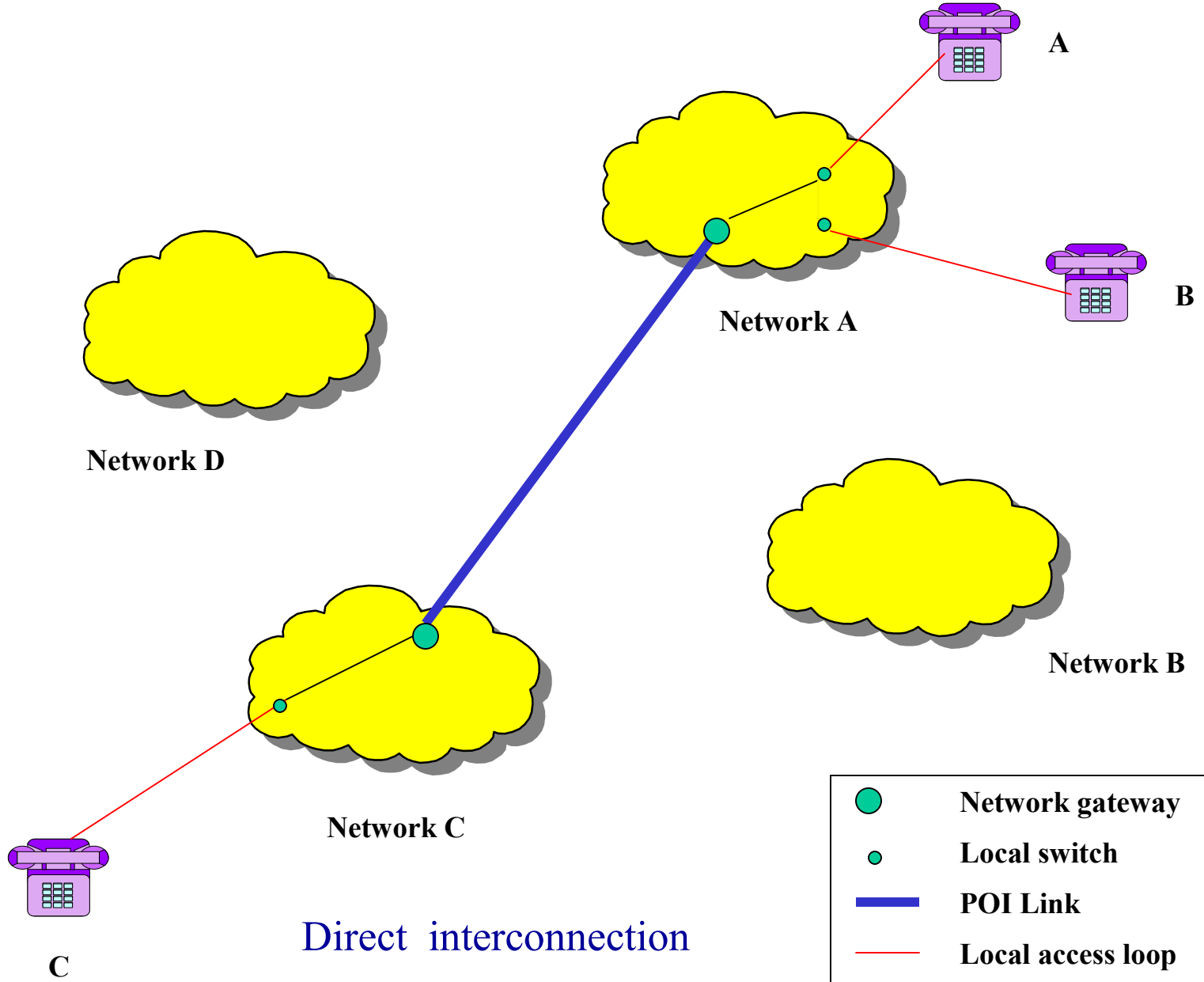
Type I interconnection

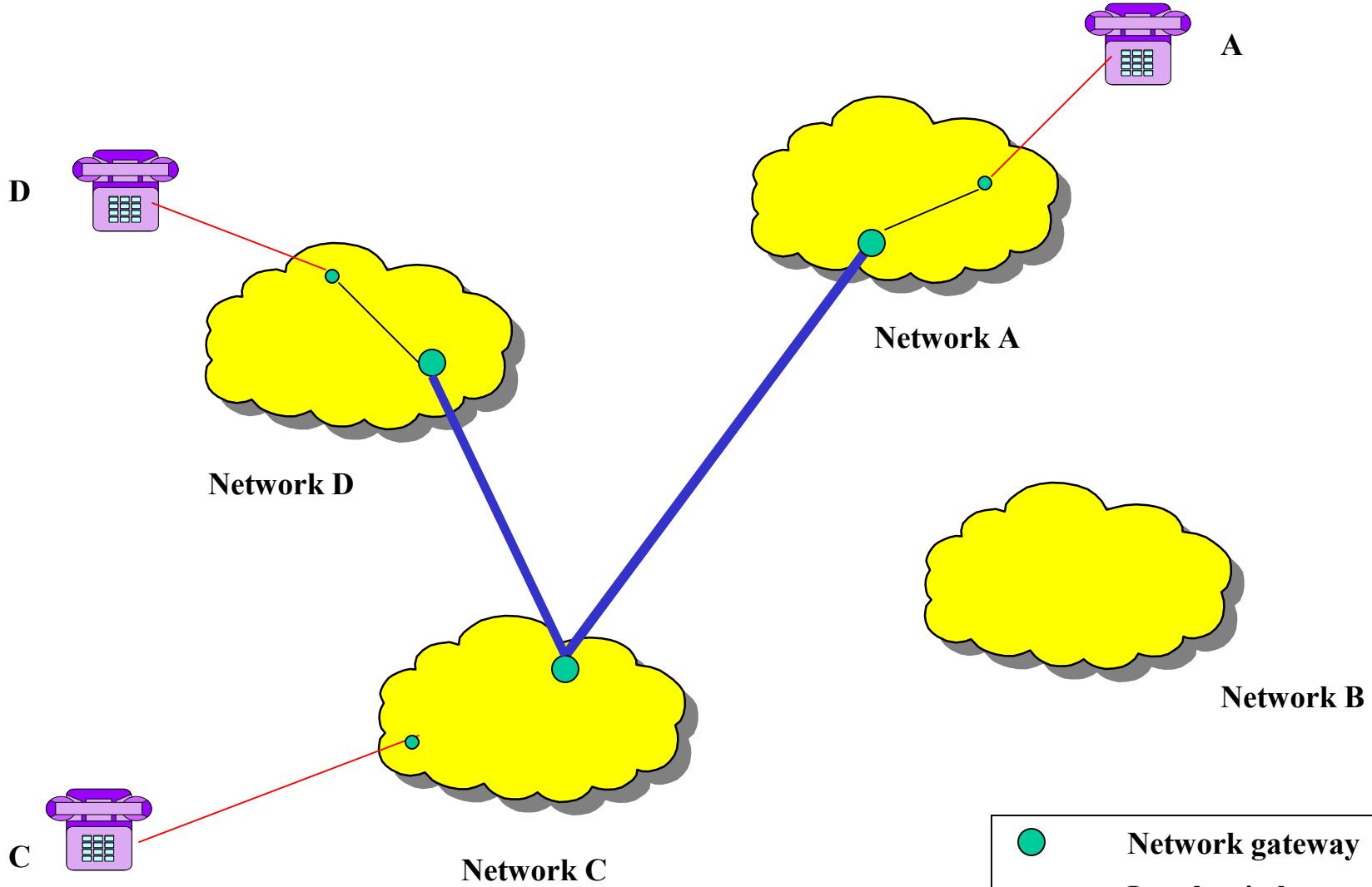
- Type I Interconnection is defined as an interconnection between network gateways of two **core networks**







Type I Interconnection

- Customers connected to any network can communicate with customers or access service providers (e.g. ISP, ETS and other VAS providers) connected to other networks. Such capability is called the “any-to-any” connectivity
 - (a) Direct interconnection
 - (b) Indirect interconnection - traffic routed via a third network





Indirect interconnection - customer access

	Network gateway
	Local switch
	POI Link
	Local access loop

Type I Interconnection

Basic principles of Type I Interconnection

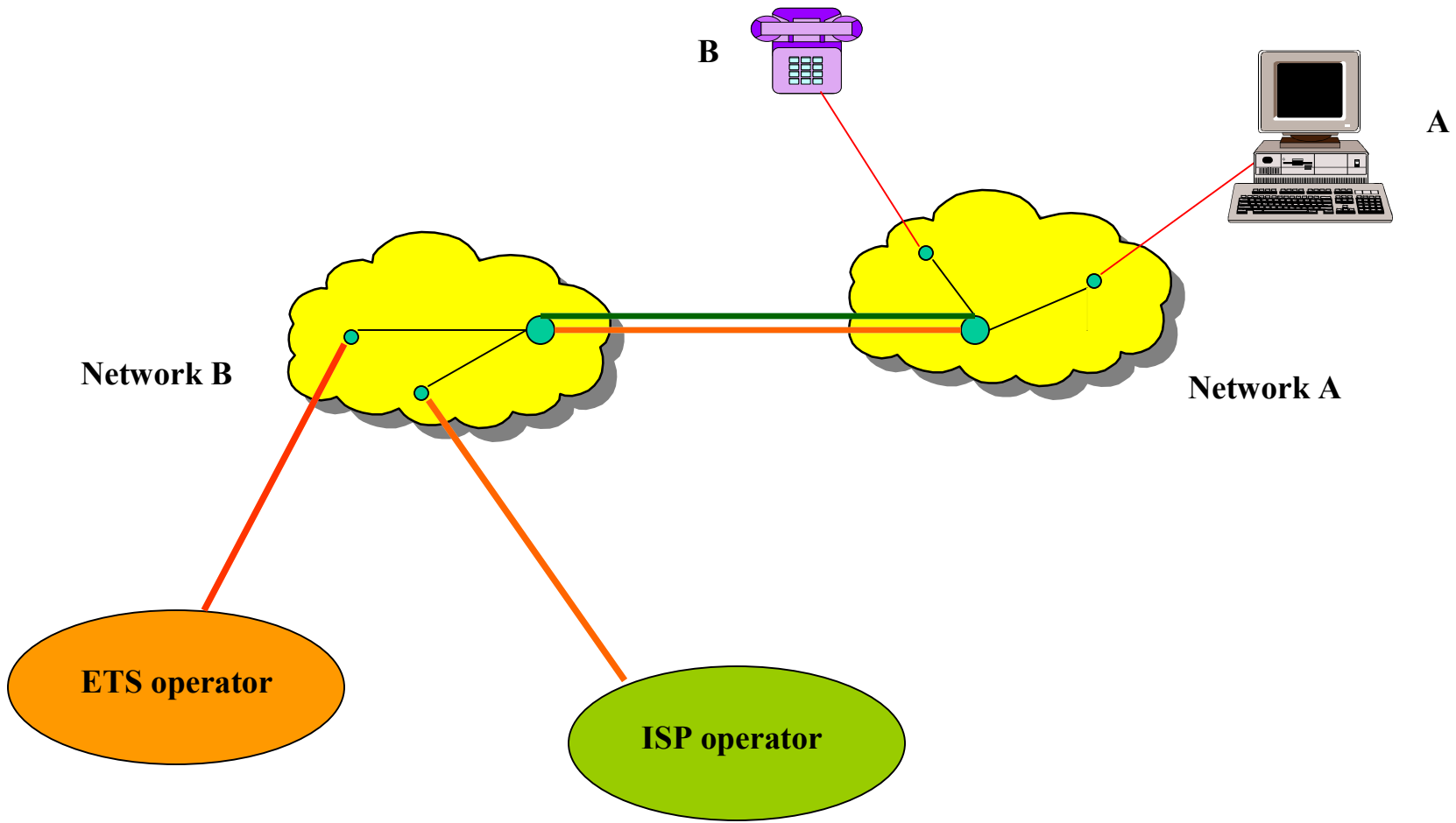
- Carriers have equal responsibility in ensuring that the two networks are interconnected promptly and efficiently
- “Any-to any” connectivity
- Interconnection upon request of another FTNS operator

Point of Interconnect (POI)

- POI is a notional point in the mid-point of the link interconnecting the gateways of two networks
- Gateways can be toll exchanges, tandem exchanges, local exchanges or dedicated interconnection gateways (ICG)

POI links

- Separate links for different traffic types (e.g. calling card / IDD traffic, internet access traffic, local voice traffic and etc.)
- Dynamic traffic pattern
- Link capacity to be dimensioned through traffic forecasting and traffic engineering theory so as to meet the specified Grade of Service (GOS)



Separate links for different traffic types

- | | |
|--|---------------------|
| | Network gateway |
| | Local switch |
| | Leased circuits |
| | POI links (for ETS) |
| | POI links (for ISP) |

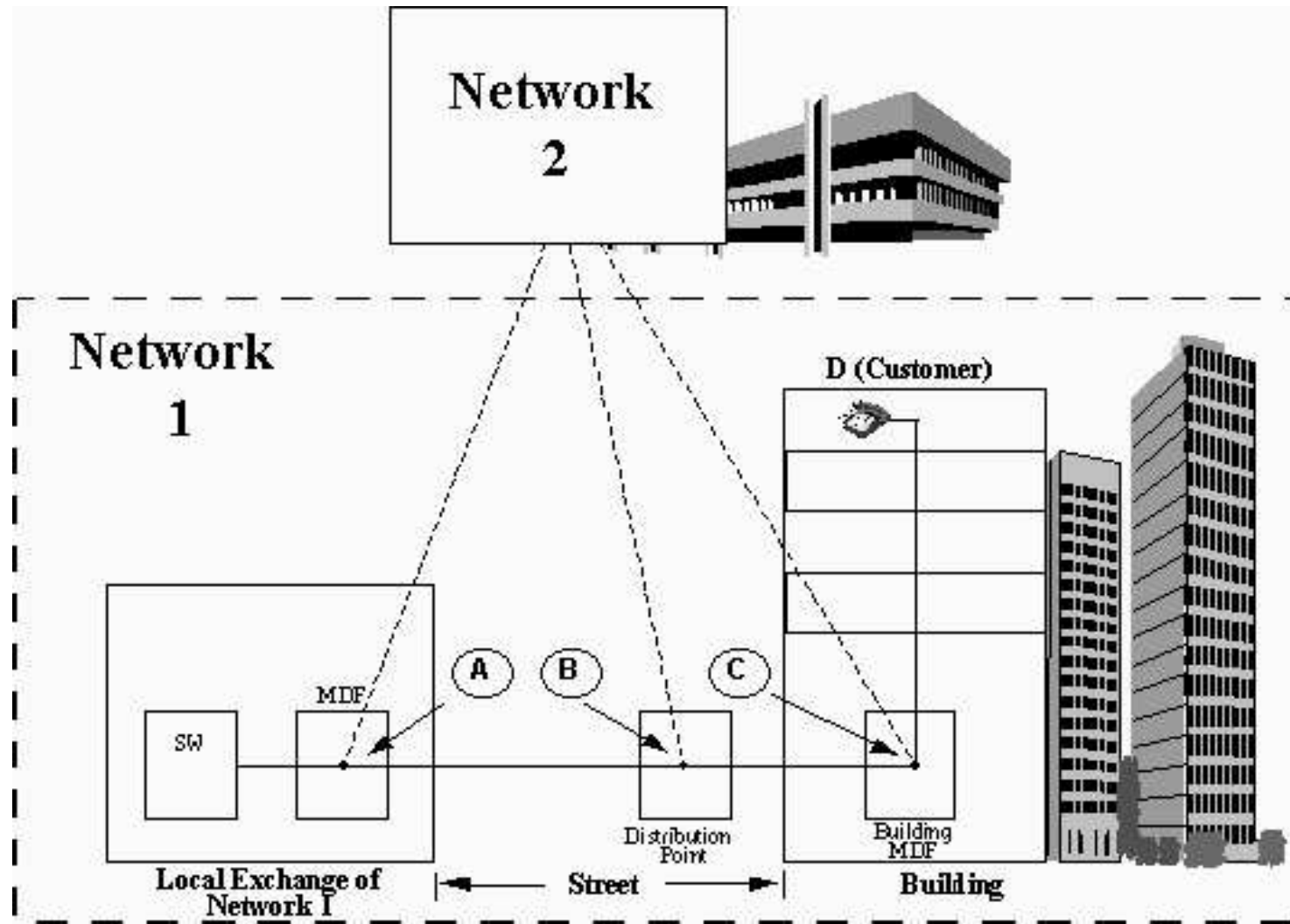
Type II Interconnection

- Type II interconnection is defined as interconnection between FTNS operators in the local loop (the last mile), also known as local loop unbundling
- when customer of one network want to move to a new network, interconnection at local loop level may be necessary

Type II Interconnection

- co-location of facilities at another operator's exchange building (A)
- access to copper-based local loops (B)
- In-building wiring system (C)

Type II interconnection



Type II Interconnection

- Four wireline-based FTNS operators are obliged to make available their copper-based local loops for Type II Interconnection
- For both narrowband and broadband interconnection, Type II Interconnection currently does not apply to optical fibres in customer access networks

Type II Interconnection

- The following operators are not entitled to Type II interconnection in the form of exchange co-location and copper-based local loop access
 - wireless FTNS licensees
 - HK Cable TV which provides service on cable modem
 - local fixed network licensees with their licence effective after January 2003

Type II Interconnection

Why Type II Interconnection?

- Solution to the proper “bottleneck” facilities
- Enable customers to be served by new entrants’ networks which may otherwise be impossible (e.g. remote areas, impractical to install second local loop)
- Efficient use of existing facilities

Type II Interconnection

Basic Principles

- Required only upon customer requests
- Facilities collocation
- Prompt, efficient and “invisible” interconnection

Type II Interconnection

- Type II Interconnection for narrowband introduced as from July 1995 when competition was introduced into the local fixed network market
- Extended to broadband services by TA Statement on “Broadband Interconnection” issued in November 2000

Type II Interconnection

Considerations of New Entrants - Build vs Buy

- To serve customers by Type II Interconnect (local loop access)
 - less initial cost, faster provision time
- To serve customers by self-built facilities
 - service and technology not limited by the existing facilities owner

Review of Type II Interconnection

- Balancing the benefits and cost of Type II Interconnection
 - Benefits : more consumer choices and competition facilitation and
 - Costs : dampening investment incentive and less innovation if reliance on cooper-based local loop

Review of Type II Interconnection

- Consultation and review done in 2004, considering:
 - the extent of market competition,
 - market share and network coverage of new entrants in 2004
- Decision was made that mandatory Type II interconnection will be withdrawn from buildings with alternative customer access networks by 2008, with the exception of buildings meeting “essential services criterion”

Review of Type II Interconnection

- Rollout of self-built network by competitors is impressive

Households %	1+ new entrants	2+ new entrants
Sept. 04	~ 61%	~ 35%
Sept. 05	~ 71%	~ 43%
Sept. 06	~ 76%	~ 51%

Review of Type II Interconnection

- New entrants have about 30% of narrowband telephone line markets
 - 11% by Type II interconnection
 - 19% by self-built networks
- New entrants have about 50% of market in broadband services, practically all by self-built networks

Charging Principles

- Operators must compensate the cost incurred to other operators with interconnection
- Encourage efficient use of facilities and minimize wasteful and duplicated facilities
- Charges for interconnection will be based on relevant cost
- The relevant cost should be measured on the long-run average incremental cost (LRAIC) model

Charging Principles

- TA issued Statement No.7 in June 95:
 - To set out the principles for interconnection charge.
 - Facilitate the carriers to make the appropriate “build” versus “buy” decision with regard to infrastructure development.
 - “Build” when the cost of network rollout < interconnection charge.
 - “Buy” when the cost of network rollout > interconnection charge.
- Statement No.7 was revised in Nov 1997 and further revised in Mar 2002 to cope with market developments since 1995.

Charging Principles

- Charging principle is based on the long run average incremental cost (LRAIC) standard, plus a cost of capital for the assets used.
- LRAIC is defined as:
 - $(\text{Carrier's total costs with the service/facility supplied} - \text{Carrier's total cost without the service/facility supplied}) / \text{Total output of the service or facility}$
 - Being based on the incremental cost of the entire conveyance service:
 - = conveyance services for the calls of the carrier's own customers + interconnecting service for the other carriers.
 - Include the shared costs which are common to all the service elements of the entire conveyance services alone.
 - Exclude shared cost that are common to the conveyance service and other services; for example, fixed cost at the corporate level.

Charging Principles – Type I Interconnection

Establishment Charge

- Cost in establishing physical link
 - calculated by LRAIC model
 - shared by interconnecting carriers
- Cost of network conditioning
 - to ensure network security and integrity, standardisation, equal access, change numbering system and the provision of calling line identification (CLI) etc Cost borne by carrier for conditioning of their own networks

Charging Principles – Type I Interconnection

Usage Charge

- Interconnection usage costs relate to the recurrent costs incurred by carriers in passing traffic from one network to another via an established interconnection link and originating or terminating that traffic within their networks

Charging Principles – Type II Interconnection

- Charging principles are more concerned with determining an appropriate charge for existing facilities rather than sharing costs of new construction.
- Charging principles are on a “LRAIC” standard, which include:
 - line dependent costs (such as the cost of installing and maintaining all cable plant and associated loop equipment)
 - fixed cost.
- LRAIC charges are separated into the different components of the local loop, i.e. local exchange MDF, distribution point, and in-building MDF.

Charging Principles – VAS and Mobile Services

- VAS and mobile network operators are considered customers of fixed networks operators
- Required to pay the interconnection charges or called Public Non-exclusive Telecommunications Service (PNETS) charge for calls originating from or terminating on the fixed network
- Only PNETS charge paid to dominant carrier is regulated
- Fully distributed cost (FDC) model, top down approach
 - OFTA reviews the charge on an annual basis, having regards to the actual operational cost and cost of capital

Comparison of Cost Models

LRAIC

- suitable for developing market
- no large indirect cost incurred on the incumbent operator

FDC

- suitable for mature market
- new entrants have to share the indirect cost with the incumbent operator

Comparison of Cost Models

Interconnection Cost Calculation

- Fixed Network Operator - LRAIC
- VAS/Mobile Services - FDC

Interconnection – IP-based Networks

- Regulatory and licensing regime for IP telephony established in 2005
- Two class licenses: Class 1 and 2 with different license conditions
- Class 1 and Class 2 services that get number blocks from OFTA are required to support any-to-any connectivity
- All the service-based IP Telephony service providers should enter into commercial agreement with one or more hosting FTNS/FC operators for interconnection with other network operators or service providers
- The provision of IP Telephony services by one service provider over the broadband connection provided by another operator without prior commercial agreement is allowed

Interconnection - Way Forward

- Fixed and Mobile Convergence (FMC) – Current consultation on the proposal of phasing out of the asymmetric “Mobile-Party’s-Network Pays” regime
- Interconnection principles and charge settlements to be studied and reviewed for Next Generation Network era

The End

Thank You