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Industry Consultation on Broadband Interconnection in Hong Kong

*Industry Forum, 27 June 2000, North Point
Government Office, Hong Kong*

Background

- **First industry consultation paper issued on 3 Nov. 1999**
- **Solicit views from industry on regulatory framework for broadband interconnection**
- **21 submissions received by 31 Jan. 2000 from operators and interested parties**
- **Second consultation paper issued on 14 June 2000 to solicit further views from industry**

Issues

- **Existing Regulation on Interconnection**
- **Whether Regulation of Broadband Interconnection is Necessary**
- **Definition of “Broadband”**
- **Network to Network Interconnection (Type I and Type II Interconnection)**
- **Network to Service Provider Interconnection**
- **Open Access to HKCTV’s Network**
- **Other Types of Interconnection**
- **General Principles of Interconnection Determination**
- **Charging Principles**

Existing Regulation on Interconnection

- **Based on the new section 36A and 36B of Telecommunication (Amendment) Ordinance 2000 (enacted on 16 June 2000)**
- **TA has the power to determine terms and conditions of interconnection, including technical and commercial terms and conditions**
- **April 1999 Statement: Commercial terms for Type II interconnection applying to data rates up to 144 kbps (ISDN Basic Rate)**
- **Terms for data rates beyond 144 kbps subject to separate commercial agreement or separate determination if required**

Whether Regulation is Necessary?

For -

- **Most extensive broadband networks of CWHKT and HKCTV than competing networks**
- **Occupying “bottleneck” facilities in buildings and public streets**
- **In-building wiring systems as “gatekeeper” undesirable**
- **no commercial incentive to interconnect if unregulated**

Against -

- **existence of alternative forms of access**
- **unnecessary regulatory intervention may remove commercial incentive to invest in broadband network infrastructure**

Whether Regulation is Necessary?

Industry's views

- **CWHKT & HKCTV:**

Regulation distorts market forces, not necessary, sufficient competition and choice of access alternatives soon available

- **Majority views:**

Certain degree of regulation necessary for creating a healthy and competitive environment and in an efficient manner

Whether Regulation is Necessary?

TA's preliminary views:

- Most of users' access through networks operated by **CWHKT and HKCTV**
- Regulation of in-building wiring systems (**virtual bottlenecks**) would be necessary
- Formulation of **basic ground rules** for the regulation of broadband interconnection
- **TA's determination** of terms and conditions of broadband interconnection should commercial negotiation fail

Definition of Broadband

- **ITU:** transmission channel capable of supporting rates greater than the primary rate (i.e. **1.544 Mbps in US or 2.048 Mbps in Europe**)
- **FCC:** for both the provider-to-consumer (downstream) and the consumer-to-provider (upstream) directions, a speed in **excess of 200 kbps**
- **OFTEL:** focus attention on services delivering information at a speed **between about 384 kbps and 2 Mbps**
- **OFTA:** narrowband Type II interconnection to basic ISDN rate i.e. 144 kbps, above this rate is reasonably considered as broadband

Definition of Broadband

Industry's views:

- **Some submissions:**

Support the definition adopted by the International Telecommunication Union (ITU), i.e. transmission rates at or higher than **1.544 Mbps** as “broadband”

- **Most submissions:**

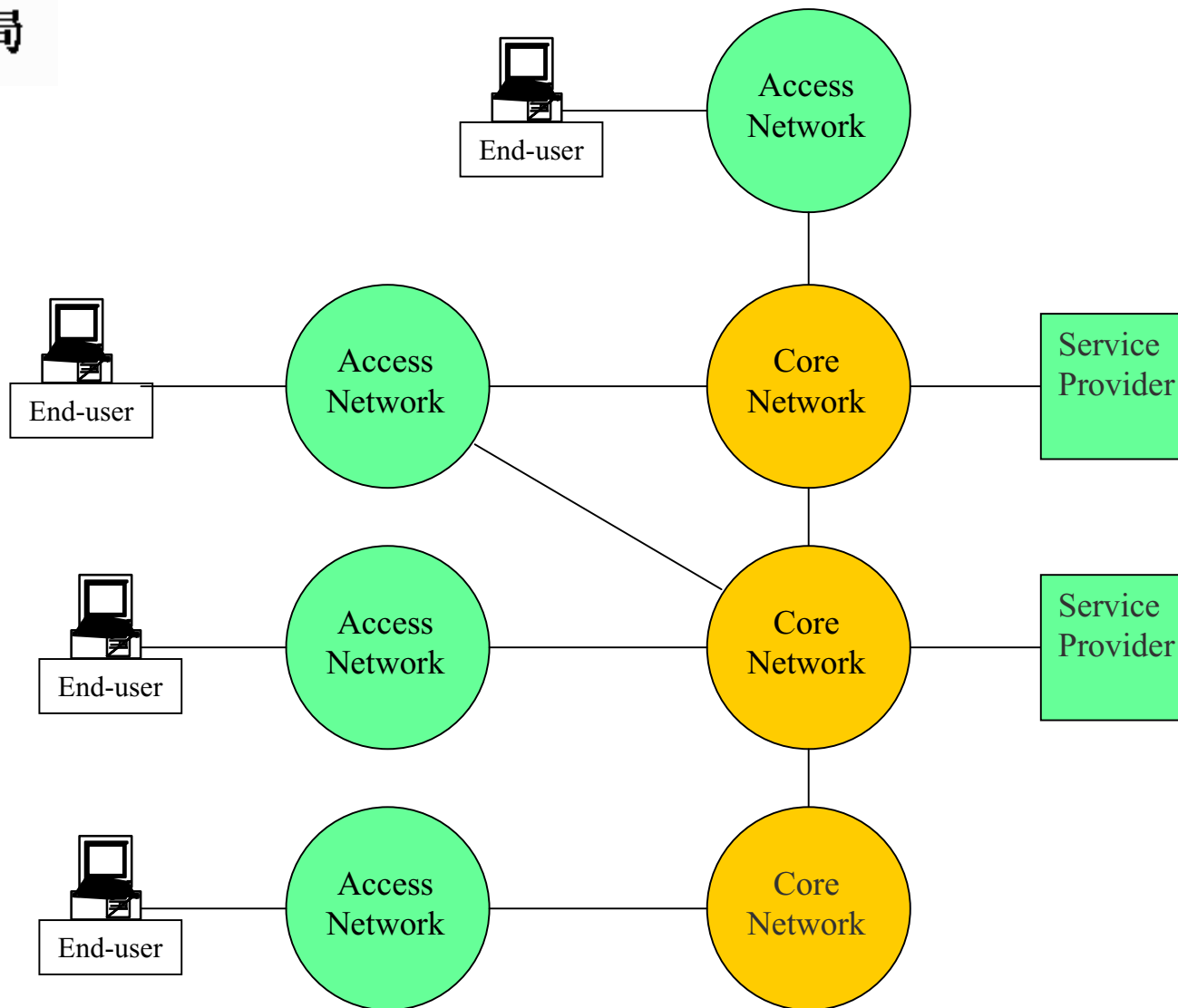
Support the TA's proposal to define “broadband” as covering services that deliver information at transmission rates **above 144 kbps.**

Definition of Broadband

TA's preliminary views:

- **Interconnection of services of transmission rates up to 144 kbps, including PSTN services, should be considered under the existing narrowband interconnection framework**
- **Interconnection of services of transmission rates above 144 kbps should be dealt with under the broadband interconnection framework to be developed**

Type I Interconnection



Type I Interconnection

- **Any-to-any principle:** a customer directly connected to one network should be able to communicate with any customer or service provider connected to another network
- **Any-to-any connectivity:** achieved in the narrowband networks
- **Inter-operability between broadband services:** technical standards at the application level may not be standardized

Type I Interconnection

Industry's views:

- **Most submissions:** supported “any-to-any connectivity” to adopt international standard for inter-carrier interface for Type I interconnection between the broadband networks
- **Some considered:** Type I physical interconnection not essential since Internet interconnect networks with one another e.g. through the regional or international backbones

Type I Interconnection

TA's views:

- **“Any-to-any” connectivity** - important policy objective for interconnection of networks to ensure access by any consumers and service providers are connected to
- **Further study** - technical feasibility of available standards between core networks before mandate by the TA
- **Final decision** - availability of commercial products e.g. B-ICI in the market, end-to-end broadband connections of IP network, other forms of broadband interconnections

Type II Interconnection

- **Overcome physical constraints - reaching customers**
- **Provision of alternative access networks - physically impracticable or unduly long time**
- **Type II interconnection**
 - **full capacity of transmission medium**
 - **capacity of transmission medium up to a defined data rate**
 - **supply of a transmission service of a defined data rate**

Type II Interconnection

Industry's views:

- **Most submissions - Type II interconnection should be mandated**
- **New T&T - remove the present upper limit of 144 kbps for interconnection to “local access links”**
- **CWHKT and HKCTV - Type II interconnection not necessary as alternative access networks exist**
- **Some considered - potential mutual interference for high-speed services at 1.544Mbps or above**

Type II Interconnection

TA's preliminary views:

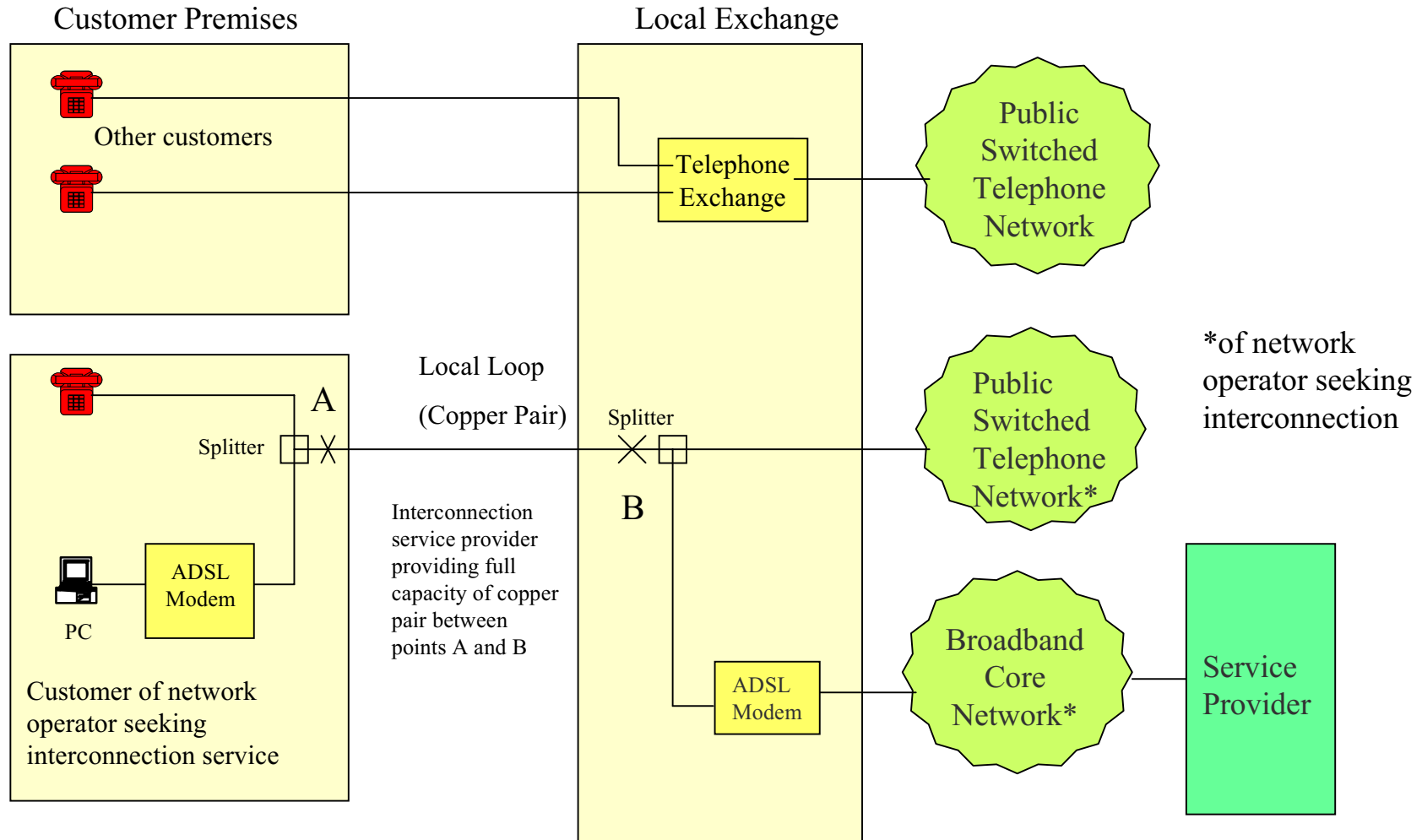
- **Overseas jurisdictions - “unbundling of local loops” similar to Type II interconnection in HK**
- **Potential interference problem under study and overcome if necessary**
- **Should be mandated at any technical feasible points along the local loops of the wire-line fixed networks**
- **Interconnection to the wireless networks should best be achieved through commercial negotiations and agreements**
- **Should be available to enable access to in-building block-wiring systems**

Type II Interconnection

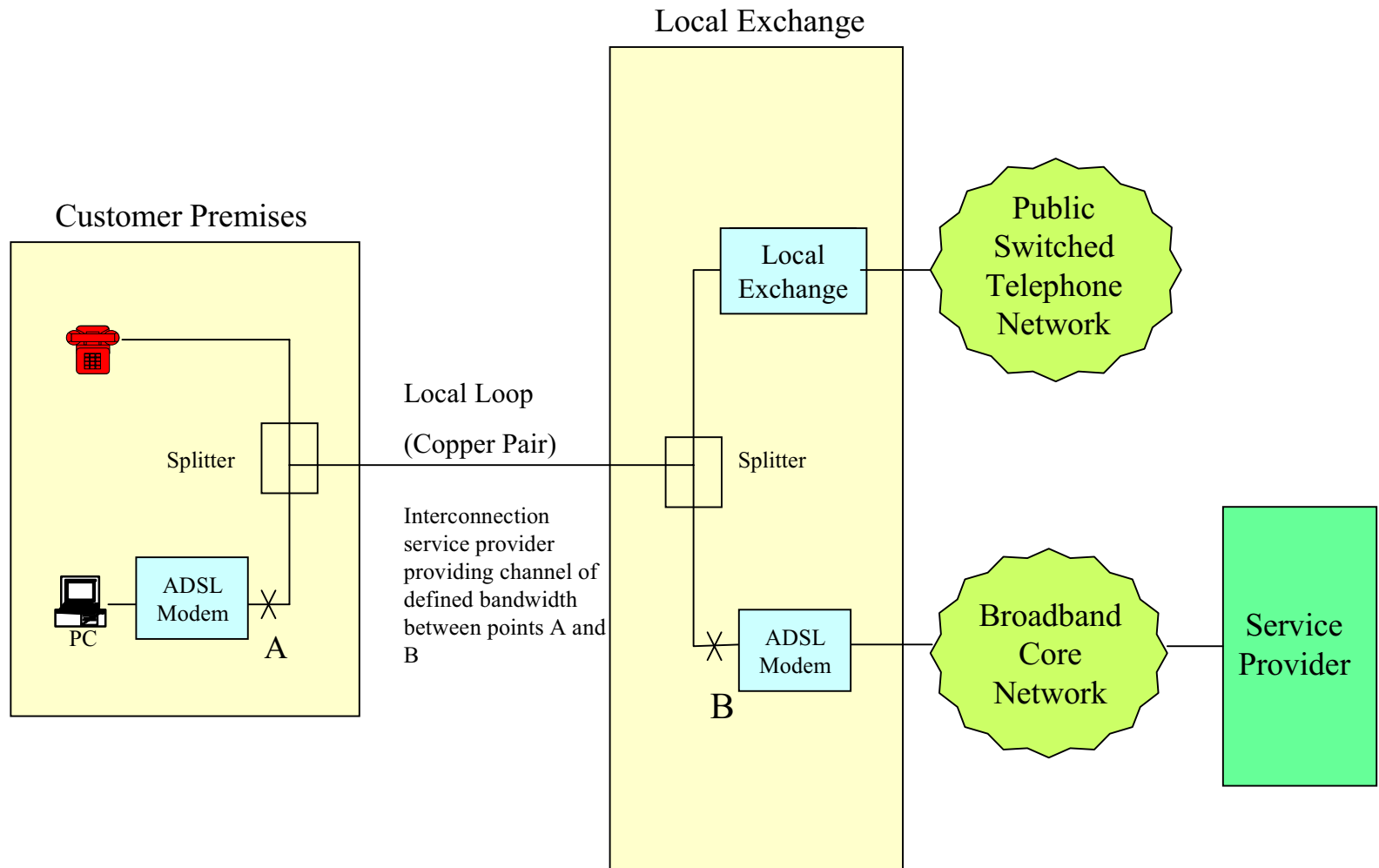
3 Configurations of Type II Interconnection

- (a) Full capacity of copper pairs (“full bandwidth option”)
- (b) Partial capacity for a defined bandwidth (“partial bandwidth option”)
- (c) Transmission service of a defined transmission rate (“transmission service option”)

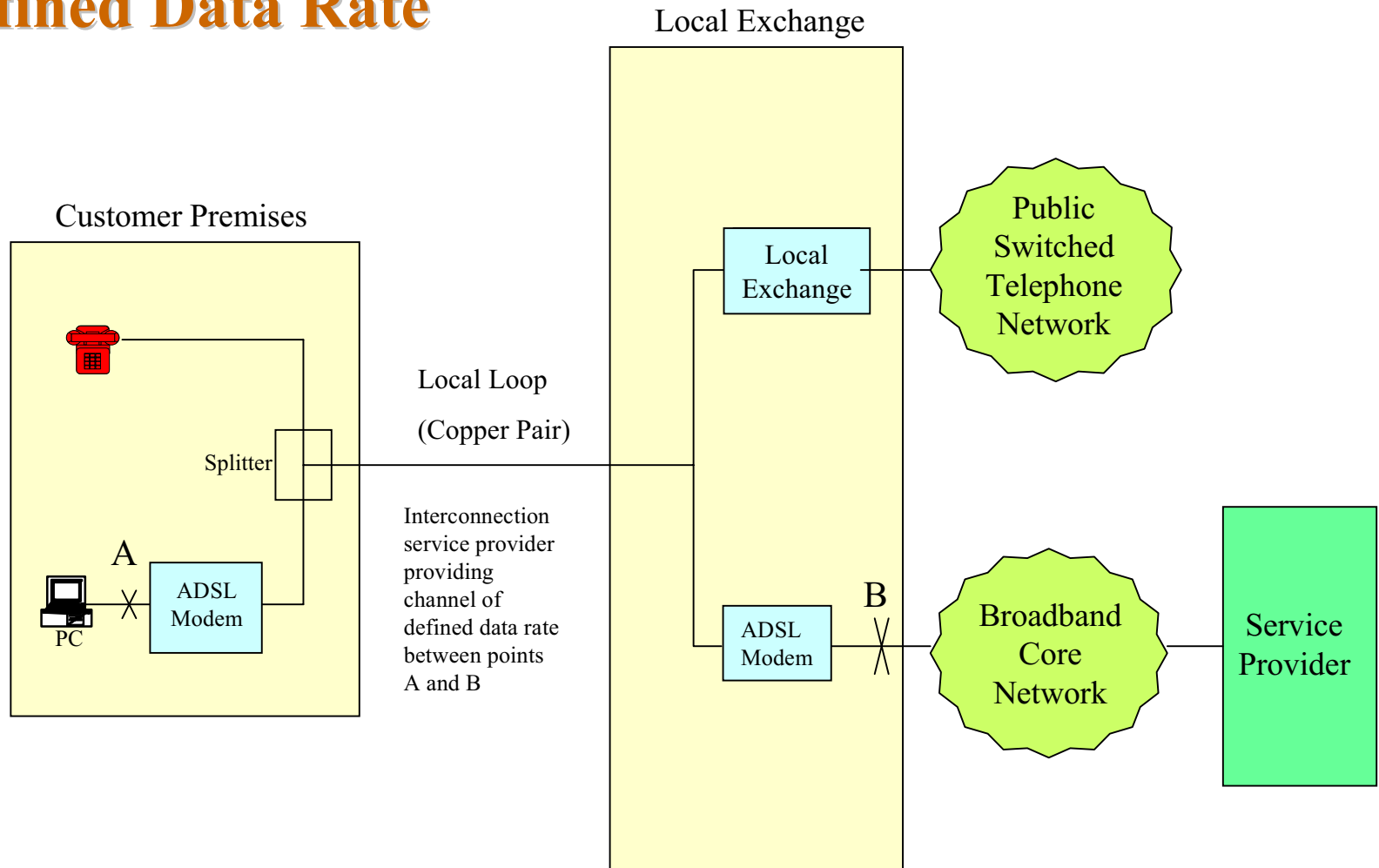
Type II Interconnection - Copper Medium with No Limit On Data Speed



Type II Interconnection - Copper Medium with Defined Limits of Data Speed



Type II Interconnection - Transmission Service with Defined Data Rate



Type II Interconnection

Industry's views:

- **Most submissions** - Type II interconnection at full capacity of copper pairs and at any technically feasible point in the access network
- **Some considered** - “partial bandwidth option” important in enabling sharing of copper loops for the carriage of existing narrowband telephone service provided by the owner of the copper loops for the transmission of broadband services by a competing operator

Type II Interconnection

TA's preliminary views:

- Both “full bandwidth option” and the “partial bandwidth option” should be available
- “Partial bandwidth option”- adopt a lower bandwidth limit rather than an upper one to allow “line sharing” with the conventional narrowband telephone services and carry higher bandwidth services such as HDSL

Network to Service Provider Interconnection

- **Narrowband services:** service providers are connected to their customers through the switched networks or dedicated circuits provided by network operators
- **Interconnection services** offered by the network operators as tariffed services

Network to Service Provider Interconnection

Industry's views:

- **Operators of “carrier” status - interconnection service to service providers should be offered by the network operators as tariffed services**
- **Service providers - welcomed to have interconnection to the network at any technically feasible points of the network. TA should develop detailed co-location rules to be followed by the incumbents**

Network to Service Provider Interconnection

TA's preliminary views:

- **Service providers - customers of network operators in the wholesale market, a pure “carrier-to-carrier” status not appropriate for broadband interconnection**
- **TA's determination of interconnection for interconnection between the networks and service providers if the circumstances so justify**

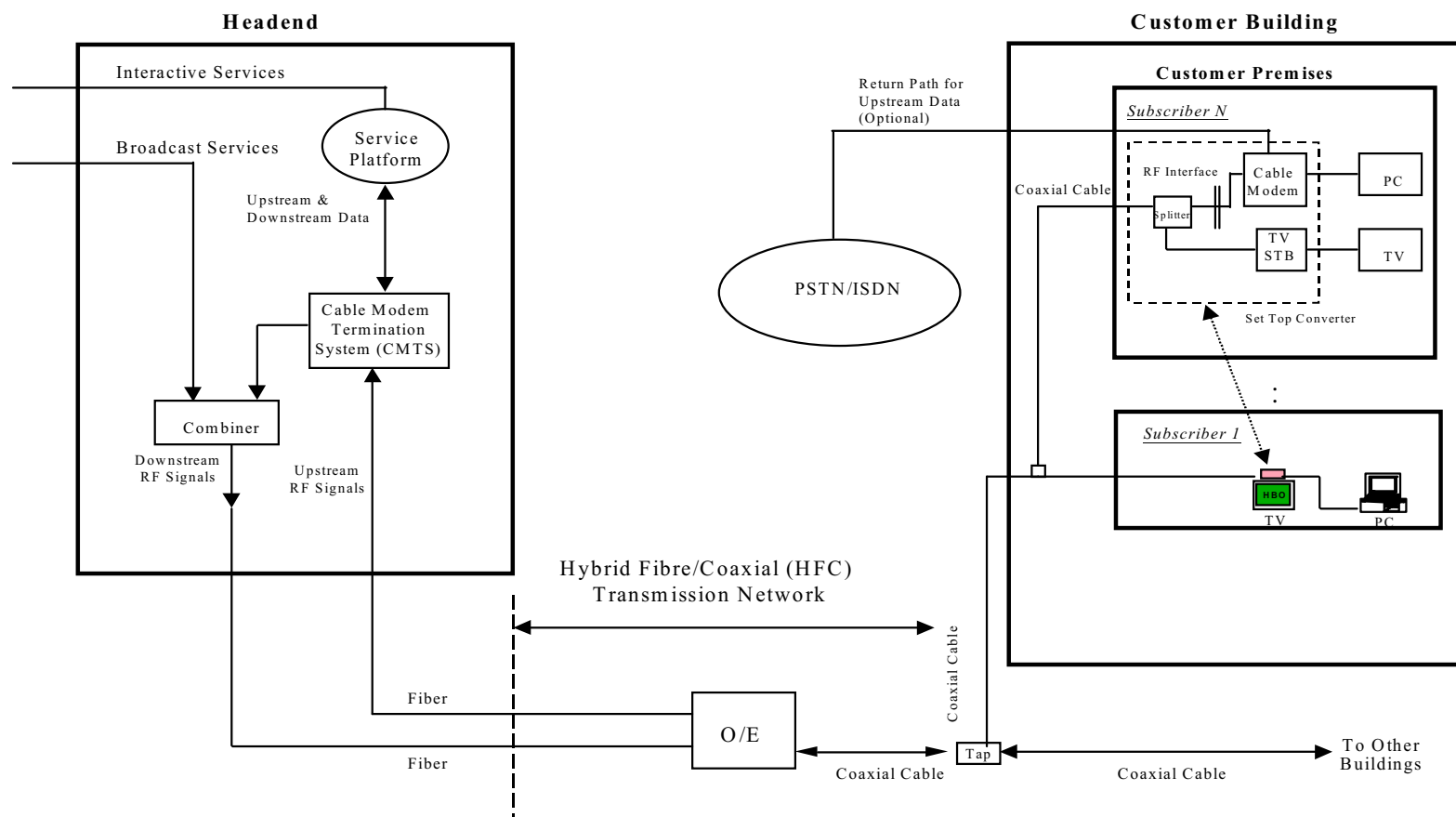
Open Access to HKCTV's Network

- **HFC cable network interconnected to service providers for various broadband services to end users**
- **HKCTV's view: Not justified to require “open access” to the cable modem services operated over the cable television network**
- **TA's view: “Open access” is a licence obligation for HKCTV**

Open Access to HKCTV's Network

Annex 3

Hong Kong Cable Television HFC Network



Other Types of Interconnection

- **TA may determine the terms and conditions of interconnection between any telecom systems and services**
- **Not restricted to a defined number of types**
- **TA prepared to consider other forms or new types of interconnections if available**

Other Types of Interconnection

Industry's views:

- **CTI: interconnection to the backbone and trunk fiber networks with only a very limited number of suppliers**
- **Level 3: external facilities operators to have right to interconnect to optical fibre disaggregated from any additional unwanted elements such as electronics or switching equipment and at a cost-based rates**

Other Types of Interconnection

TA's views:

- **Interconnection to backbone and trunk networks is a form of interconnection covered under section 36A**
- **TA's power under section 36A would depend on whether such regulatory intervention is necessary to promote competition and protect consumer interest**

General Principles of Interconnection Determination

Investment Incentives and Promotion of Open Access and Competition

- **Objectives:** promote public access to broadband services at affordable prices, maintain commercial incentive for further rollout and upgrade of networks, and for continuous investment in related infrastructure
- **Industry views:** Agreed by most but a few commented that these are difficult and sometimes conflicting objectives

General Principles of Interconnection Determination

Investment Incentives and Promotion of Open Access and Competition

TA's views:

- **Appropriate charging model with investment and operating costs, plus a reasonable cost of capital commensurate with the risk of the network investment**
- **Levels of interconnection charges provide incentives for new entrants in infrastructure investment and offer opportunities for the service providers to extend their services to the end-users**

General Principles of Interconnection Determination

Preference for Settlement by Commercial Negotiations

- **Industry's views:** Almost all submissions agreed to the principle of commercial negotiation for the relevant charges and conditions for interconnection over the broadband networks
- **TA's views:** prefer to minimise the level of regulatory intervention

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BROADBAND INTERCONNECTION

ECONOMIC PRINCIPLES

Policy Principles

- **Promote public access to broadband services at affordable prices.**
- **Maintain commercial incentive for networks investment.**

Major Difficulties

- **Asymmetric market position and bargaining power delay negotiation process.**
- **Unduly low charges dilute the commercial incentive.**

Solution

- **Appropriate charging model, which takes account**
 - **Investment and operating costs; and**
 - **Reasonable cost of capital.**

- **To simulate the outcome of a competitive market.**

Minimum Regulatory Intervention

- **Preference for commercial agreement.**
- **If failed, TA to mediate or make determinations based on some pre-determined principles.**

Concerns Over Commercial Negotiation

- **Asymmetric market power, difficult to achieve fair bargaining position and thus successful negotiations on a timely basis.**

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➤ **Long Term Development**

- **When market becomes mature, network operators would recognize the value of coverage and connectivity.**
- **New delivery technologies to stimulate competition and effective commercial negotiations.**

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➤ **Meanwhile**

- **Closely monitoring.**
- **Make sure access terms no less favourable than those provided for incumbent's own affiliates.**

Importance of Clear Guidelines

- **Considering**
 - **Extensive coverage and significant market power of incumbents;**
 - **Their control over some bottleneck facilities;**
 - **Time required for the new broadband delivery technologies and services to become viable.**

- **Basic ground rules are essential.**

Charging Principles

- **Pricing Models**
- **Costing Standards**
- **Cost of Capital**
- **Responsibility for Bearing Costs**
- **Structure of Charges**
- **Essential Support Elements**

Pricing Models

➤ **Four charging options:**

- (a) Long Run Average Incremental Cost (LRAIC);**
- (b) Fully Distributed Cost (FDC);**
- (c) Retail minus approach; and**
- (d) LRAIC plus lost profit, or ECPR.**

LRAIC

- **Generally accepted.**
- **Reflect current cost of construction or replacement of network.**
- **Facilitate efficient entry and allocation of resources.**
- **With appropriate cost of capital, no disincentive on investment.**

LRAIC Charging Approach is NOT Marginal Cost Approach

- **Not appropriate to be based on the pure “marginal cost” approach.**

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➤ Instead

- **Include all avoidable, incremental costs of the entire service in the long run.**
- **For example, costs of setting up and maintaining the entire local loop system.**

Business Risk and Investment Incentives under LRAIC Approach

- **TA accepts wider business potential associated with higher business risk.**
- **To maintain investment incentive, the TA wants to ensure**

- **No one can be a free rider.**
 - **All users should pay a fair compensation for the resources used.**
 - **All parties sharing the appropriate business costs and risks.**
- **LRAIC can capture the risk with different technologies and stages of investment through adjustment of the cost of capital.**

Other Charging Options **NOT** Appropriate

➤ "Retail minus" Approach

- **Where new technologies and competition would exert pressure on the retail prices.**
- **Relatively simple and avoid excessive administrative burden.**

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- **Ensure always a sufficient margin in retail services.**
- **Prevent the network operator from leveraging its position into the retail market.**

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- **However, major drawbacks if**
 - **Unstable or even negative profit pattern arises in the retail segment.**
 - **The retail prices contain monopoly profit elements.**

➤ **FDC**

- **Fails to distinguish specific investments and create distortions.**
- **Drawback of complications and imposition of barriers to entry.**

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➤ **ECPR**

- **Perpetuates monopoly profits.**
- **Opportunities foregone difficult to assess.**

Costing Standards

- **Mostly agreed that forward-looking or replacement cost standards are better.**
- **Produce the correct market signals on “buy or build” decisions.**

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- **The TA would ensure forward-looking or replacement costing principle by**
 - **Proper accounting reporting procedures.**
 - **Continual inputs from the industry.**
 - **Use of the incumbent's reported costs as the basis of estimation and make adjustments.**

Cost of Capital

➤ **In the determination of appropriate cost of capital**

- **Newly made and technology-dependent investment bear a higher risk and thus higher cost of capital.**
- **Logical to properly identify such risk and incorporates it into the LRAIC model.**

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➤ **For new investments,**

- **Consider engaging external consulting firms.**

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➤ **For existing infrastructure**

- **Difficult to identify the components in the existing infrastructure and to separately assess.**
- **These costs still should not be disregarded.**

Responsibility for Bearing Costs

- **Operators must pay for the relevant costs that they cause other operators to incur.**
- **Establishment costs relate to the costs incurred in order to operationalise the network interconnection.**
- **Usage costs are traffic sensitive and cover the recurrent costs.**

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➤ **Regarding Establishment Costs**

- **Considered as part of investment and thus initially funded by individual operators.**
- **Party requesting interconnection to pay for**
 - 1 **all the incremental costs for establishment;**
 - 2 **appropriate cost of capital.**
- **In proportion to the usage or capacity shared.**

➤ **Regarding Usage Costs**

- **Complexities to identify and record all “requests” and “responses”.**
- **“Traffic-originating or traffic-terminating parties pay” principle not fit every situation.**

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- **“Inter-offset” settlement or “peering arrangement”.**
- **It takes time for industry to discuss and develop such arrangements.**

Structure of Charges

- **Must reflect the behaviours of the underlying costs.**
- **Agreed that different technologies may involve different cost characteristics.**
- **A cost-based charging model thus warrant different structures of charges.**

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- **However, costly administrative burden if access each costs and charge individually.**

- **May remove the incentive of the network operators to lower their costs.**

- **TA's Preliminary view**
 - **Not necessary to specify particular cost structure to be applied generally.**

Essential Support Elements

➤ Definition

- **Passive, fundamental network elements that are made available, with no cost-effective, viable alternatives.**
- **For example, equipment rooms, cable entry points, risers, ducts and conduits.**

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➤ **TA considers that**

- **Determination of the terms and conditions should be extended to essential support elements.**
- **Establishment and maintenance costs should be shared in relative proportion of the capacity being requested.**
- **Cost of modification should be borne by the requesting operators.**

All consultation papers and industry submissions about broadband interconnection could be downloaded from OFTA's Internet Web Site:

URL Address : <http://www.ofta.gov.hk>

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Q&A