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Regulatory and Security Issues arising from the Migration to Next Generation Network (NGN)

T F SO

Office of the Telecommunications Authority, Hong Kong

http://www.ofta.gov.hk

Agenda

- Characteristics of NGN
- Regulatory Challenges
  - Standardisation and Interoperability
  - Quality of Services
  - Interconnection Charging Regime
  - Universal Service Obligation (USO)
  - Economic and Competition Issues
  - Numbering and Addressing
- Network Security
  - Strategy and Policy
  - Cyber Law
  - Incident Response
  - Public Awareness

Characteristics of NGN

What is NGN

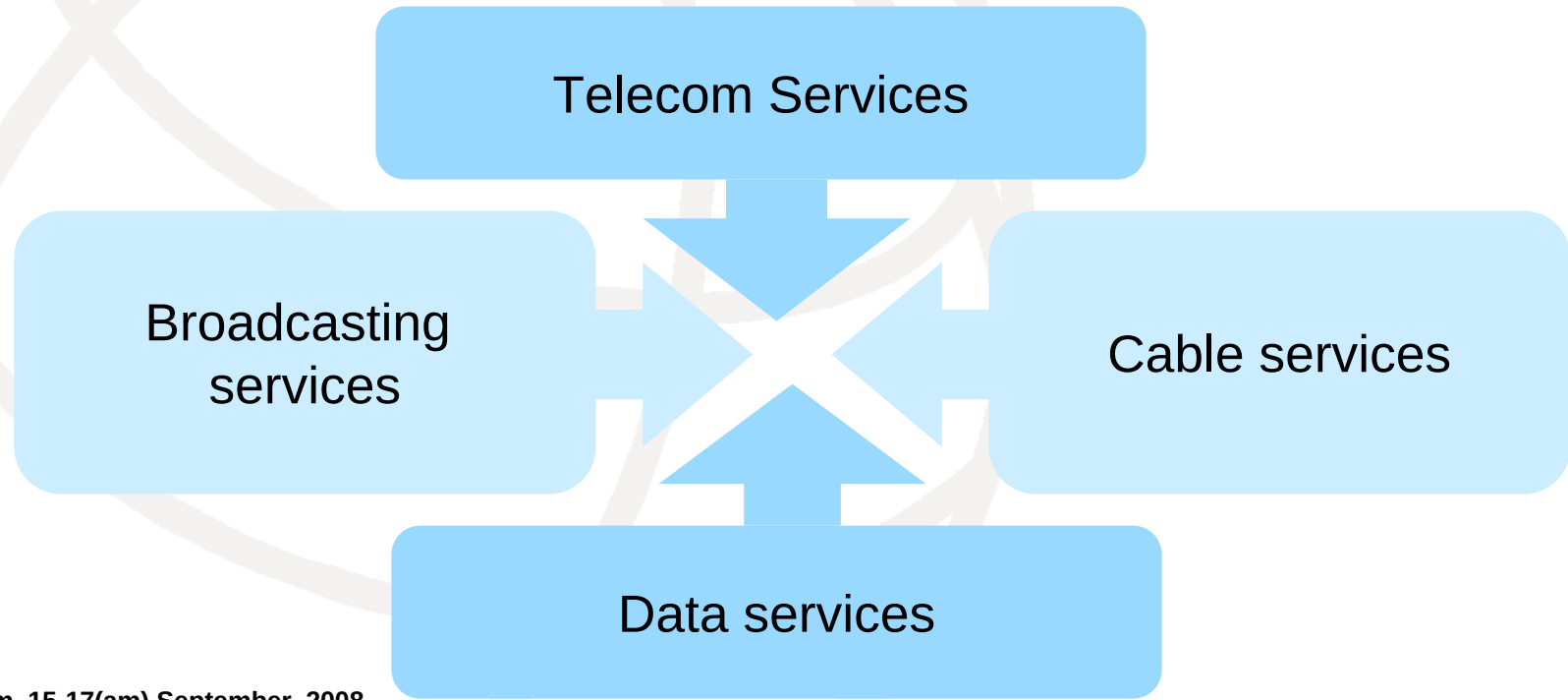
NGN refers to a network that is based on the Internet Protocol (IP) technology and is capable of supporting multiple services. Instead of deploying different networks for different type of services based on the traditional approach, NGN adopts a layer approach that allows service providers to provide services to customers over a single network without any restrictions from the underlying transmission technologies. Customers may access the various services through different access networks by wireline or wireless means.

NGN leads to Convergence

- Evolution in core and access networks
  - IP–based NGN core can be connected to different types of access networks, fixed or mobile, wireline or wireless
  - Single platform with multiple services
- Integration of consumer equipment
  - Single equipment with multiple functions (e.g. 3G phone with voice, Internet access and TV receiver functions)

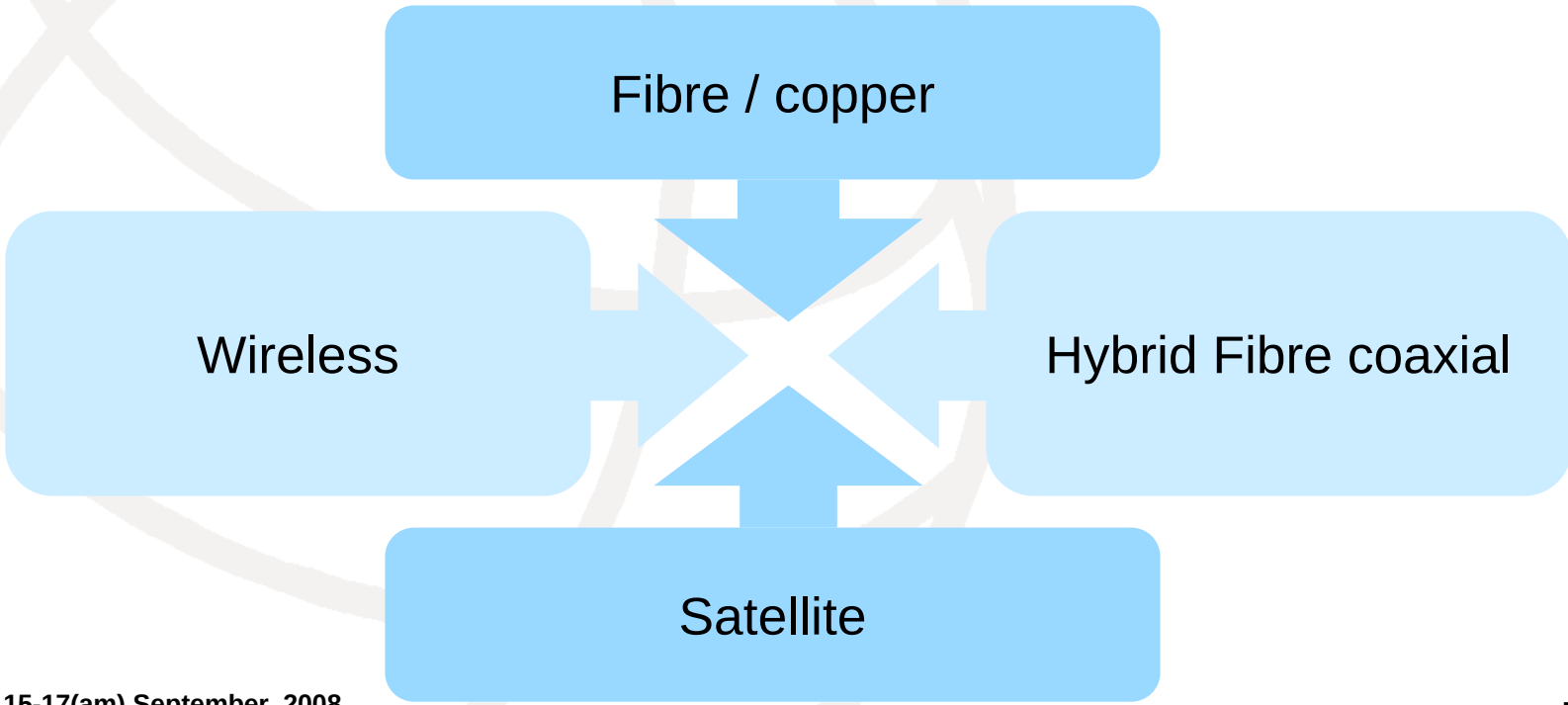
Convergence of Service Providers

- Service provider has capability to offer multiple services



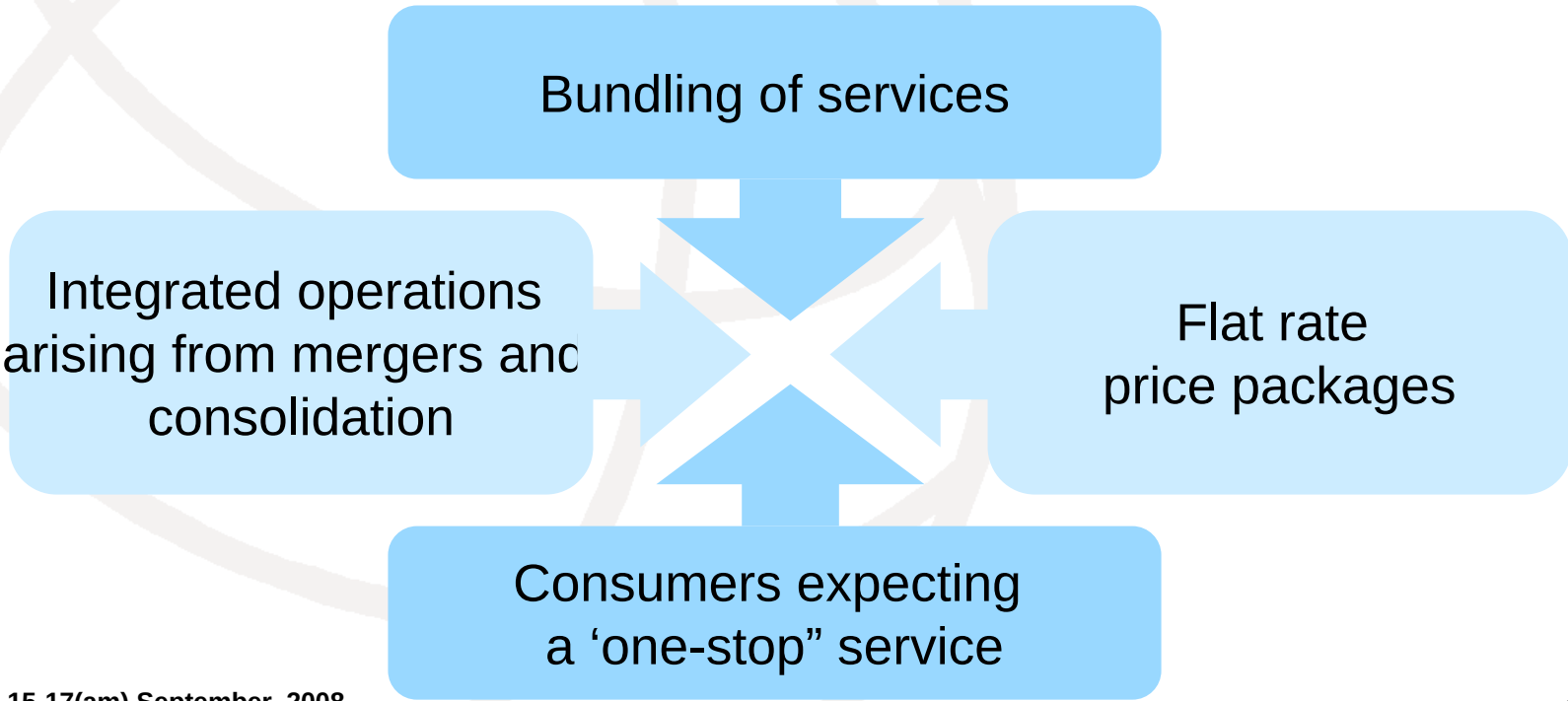
Convergence of Service Platforms

- Broadband wireless technologies delivering both fixed and mobile services
- IP Multimedia Sub-system (IMS), an enabling service platform which offers to support fixed and mobile services



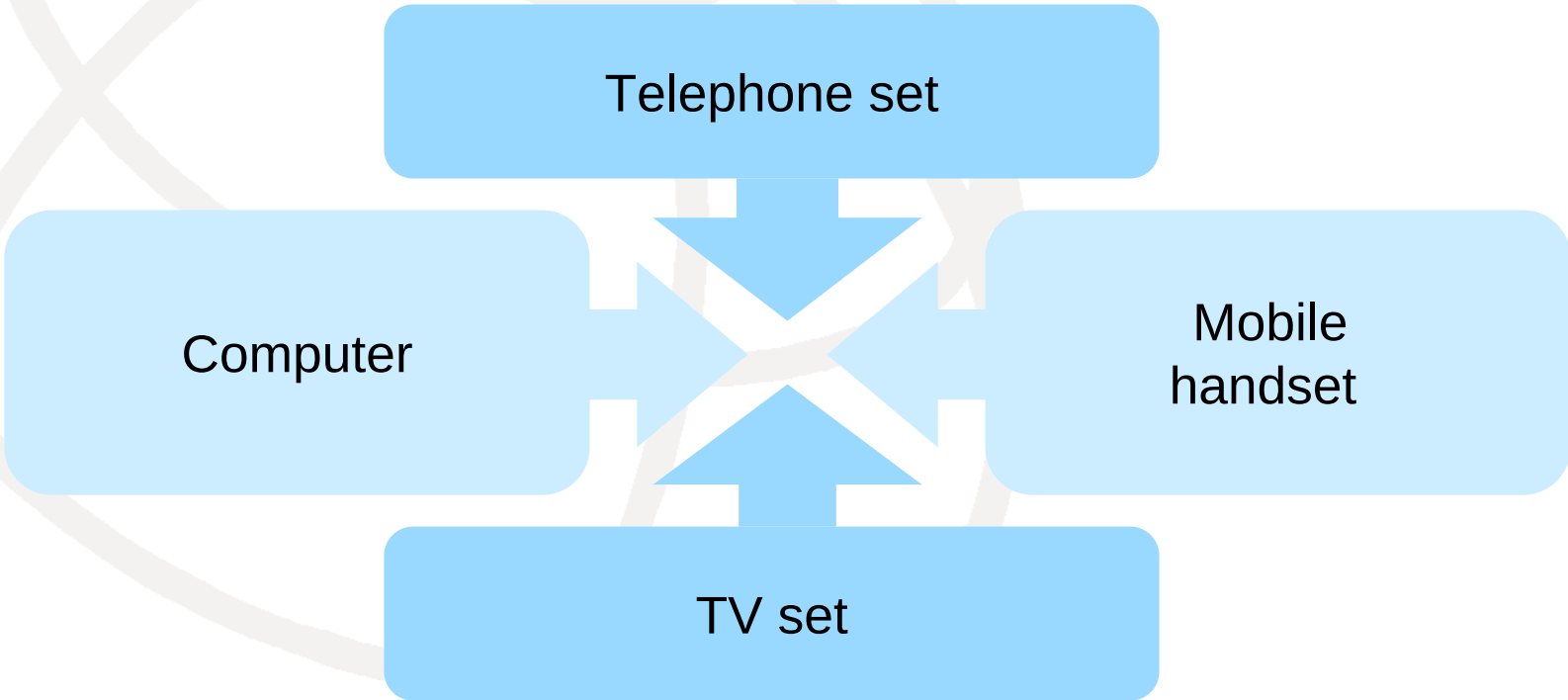
Convergence of Markets

- Mobile fixed substitution
- Triple play packages offered by cable TV operators and telecommunications operators



Convergence of Terminal Equipment

- Integrated customer terminal equipment allows end users to access a variety of services that would require multiple terminals previously



Convergence of Regulators

- Broadcasting
- Telecommunications
- Internet

Regulatory Challenges

Standardisation and Interoperability

- Interconnection standards set for conventional telephone networks. Need to set interconnection standards for NGN? Or leave it to the market to decide?
- Difficult to adopt NGN interconnection standards acceptable to all industry players at present because:
  - Different pace of migration to NGN by different service providers
  - Lack of a widely recognised interconnection charging regime that suits NGN
  - Networks still interconnecting at TDM gateways, not between NGN cores
  - Beneficiary service providers tend not to give up per minute based interconnection charging
  - Different services may have different interconnection requirements

Quality of Service (QoS)

- Should ISP be required to safeguard QoS of VoIP services?
- Is “best effort” delivery of VoIP (or other real-time services) by ISP good enough?
- Should ISP be permitted to charge VoIP service providers for QoS guarantee?

Interconnection Charging Regime

- To ensure that interconnection with a dominant operator satisfies the requirements for non-discrimination
- New Charging models need to accommodate the NGN-NGN connection and NGN-legacy systems interconnections
- Interconnection between ISPs is currently based on peering and operated under commercial agreements
- To avoid premature intervention

Universal Service Obligations (USO)

- Due to fixed mobile convergence, there is scope for USO be satisfied through the provision of either fixed or mobile service
- With the advances of access networks, in particular wireless networks (eg WIMAX), the scale of USO will diminish
- Should broadband service be included in the USO regime? (a social issue)

Economic and Competition Issues

- Net neutrality
  - Largely a socio-political debate
  - Perceived bottleneck at the network layer (but is it true?)
  - Market power emerges from application layer due to NGN
  - Need to regulate the application layer?
- Regulatory approaches to network layer
  - Accounting separation – cost based interconnection
  - Operational separation – non-discriminatory access to network of a wholesaler
  - Structural separation – operator of network layer to provide equitable access to providers of the application layer
- Shall we leave these issues to the market to decide?

Numbering and Addressing

- E.164 numbers (country code + local numbers)
  - Widely adopted in conventional circuit switched network
  - Also deploying in NGN (i.e. VoIP works on E.164)
  - Keep using in short and medium term
  - May require longer digit numbers if strong demand of numbers for NGN services
- Domain Name Addressing (e.g. user@domain)
  - Rely on Domain Name System (DNS) to translate domain names to IP addresses
  - May be largely deployed in the future NGN
  - Can user address be portable from one domain to another, like telephone number porting?
  - Needs to be regulated?

Network Security

Strategy and Policy

- Open Network → vulnerability to attack
- Need a leading organisation within the government to strategise and make policy on cybersecurity of critical information infrastructure of all sectors, including eg financial, medical, energy supply, water supply, telecommunications and broadcasting
- Each sector to have its own focal point

What Kinds of Cyber Threats

- Physical damages to networks and equipment
- Service disruption – eg. worms, virus, denial-of-service attacks
- Intrusion – eg. hacking, web defacement
- Data leakage – eg. Eavesdropping
- Fraudulent website or email – eg. Phishing, spamming

Cyber Laws

- Need a single piece of legislation?
- Cyber crime “advances” much faster than law making
- Spam – a starter of cyber crime
- Cross-border cyber crime – international cooperation needed

Incidents Response

- Computer Emergency Response Team (CERT) for each sector
- Needs a centralised coordination point

Public Awareness

- Cyber threats propagate down to user terminal level (eg a 3G phone)
- Individuals need to address his own cybersecurity
- Tremendous amount of resources has to be put on consumer education

Conclusion

- NGN still in the early stage of deployment
- Many issues remain to be resolved
- Close monitoring of market development needed
- Rely on market force if possible
- Heavy-handed regulations may jeopardise innovation
- Cyber threat - A by-product of a heavily connected telecommunications infrastructure