5. Interconnect Clearing House – (ICH)

Interconnection is the linking of the networks of two or more service providers, thus enabling the subscribers on one network to access the subscribers of the other networks. In a multi-operator environment such as Ghana, seamless interconnection has been one of the contributory factors to the growth of the industry.

In proffering a solution for the challenges faced by operators who have implemented a peer-to-peer interconnect scheme, the International Telecommunications Union (ITU) as per Annex VI of ITU_D Study Group 1 3rd Period (2002-2006) Report on Interconnection has recommended the adoption of interconnection through a clearinghouse as the ideal model for all emerging telecommunications markets because of the tremendous benefits it offers to the growth of the industry.

Under the interconnection through a clearinghouse model, each service provider interconnects with other operators through an exchange point. Rather than make separate multiple interconnections to each operator, interconnection is established at the central switching point. The central switching centre, in addition to possessing a switch, must also have inter-carrier billing and settlement capabilities. This interconnect model has a number of advantages and benefits for the operators.

An interconnect clearinghouse as recommended by the ITU combines the traditional transit switching functions of a tandem operator with the financial services of a clearinghouse in the provision of efficient interconnect links.

The purpose of the Interconnect Clearing House is to provide a common, independent mechanism for the billing and settlement of interconnect accounting traffic for all the existing and future Operators in Ghana.

Old Approach

Prior to the ICH, interconnection scheme adopted by Operators in Ghana was the peer-to-peer interconnection. Each service provider directly connected some of its switching centres to the switching centres of other service providers within the same geographic location.

Under this peer-to-peer interconnect scheme, the number of independent links required to connect each operator (without redundancies on the links) is $N = n(n-1)/2$. For a city (such as Accra) with 6 operators this gives a total of 15 links. In reality however, there are 32 links between Operators in Accra due to multiple switch locations of some Operators.

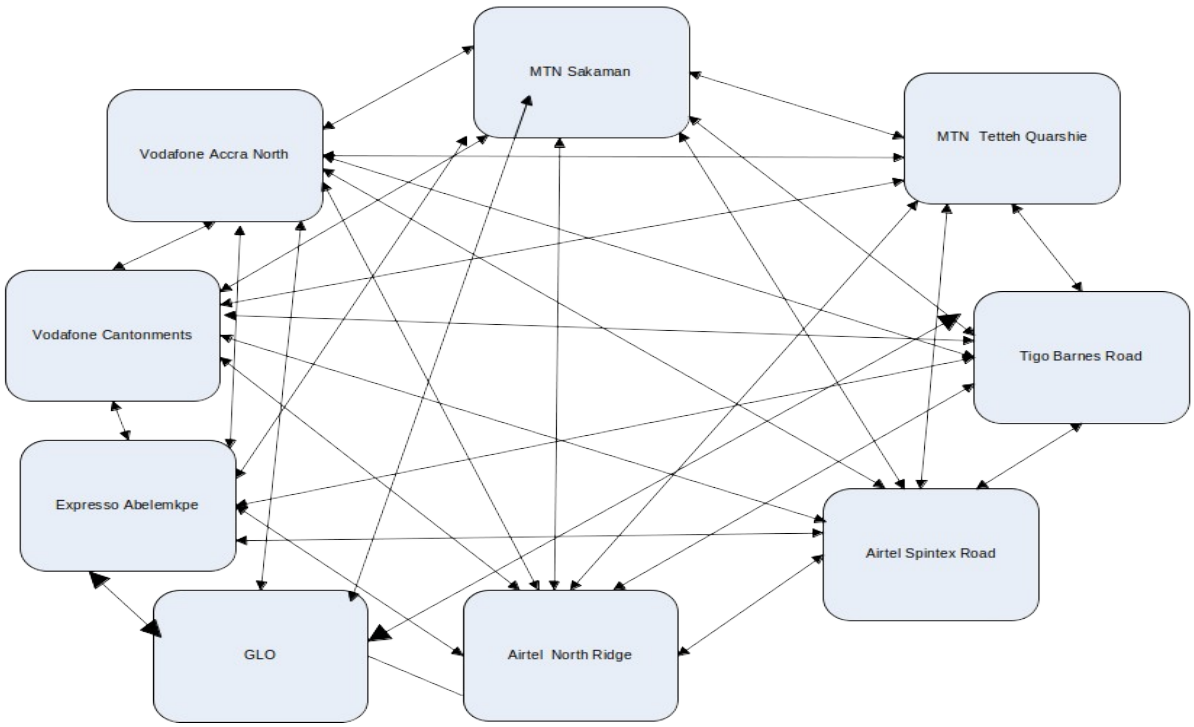

Figure 1: Illustration of the peer-to-peer interconnection links of Operators in Accra

The resulting topology of a meshed spaghetti network as shown in Figure 1. The peer-to-peer arrangement is complex to manage, expensive to implement by new entrants, and prone to link failure.

The challenges of peer-to-peer interconnect scheme cut across the technical, financial, and regulatory processes that must be put in place to ensure efficient operation.

These challenges are further explained below:

- Inefficient interconnect scheme:

The peer-to-peer interconnect scheme has led to complexity in the network architecture, resulting in inefficient routing of calls across networks. When the direct links between operators are broken or disrupted, the process of rerouting calls through alternative paths becomes complex since alternative routes may not be able to carry all the traffic of the affected route.

- Insufficient interconnection capacity:

Some Operators have had difficulties expanding their interconnect routes to other networks. This led to severe congestion on those routes and networks. This affected the quality of service of the calls made on the networks.

- Interoperability of multiple equipment types:

Service providers currently utilize several access technologies. We have GSM operators, a CDMA operator and fixed telephony operators. The interconnect equipment of these operators must be able to talk to each other for seamless interconnection of calls to take place. It is currently a major problem for some operators to properly interface their network with that of other operators utilizing different access technologies. Even though all GSM Operators can send multimedia messages (MMS) on their networks, there is no exchange of multimedia messages among GSM operators. There has been stand-off among operators where one wants to interconnect on E1 level whilst the other wants to interconnect on STM-1 level. This led to situations where there were delays in expansion which affected the quality of calls to those networks. As the number of links required increases under the peer-to-peer scheme, so does the problem of interoperability of equipment types.

- Inability to reconcile call detail records:

Some Operators are currently burdened with high interconnect debt rates. The debts are being disputed because the calls were exchanged under a peer-to-peer interconnect scheme and there is no third party CDR to be called upon for proper reconciliation. In addition, some operators do not have the financial resources to deploy a robust inter-carrier billing platform that is necessary for accurate interconnect reconciliation.

- Anti-competition Practices:

Under the peer-to-peer interconnect scheme, anti-competition tendencies by operators are rampant. New operators or new expansions are delayed for as long as one of them may choose to delay. Due to international transit route among Operators, there have been international calls routes through the local routes presented as local calls.

New Approach

The NCA licensed Afriwave Telecom Limited to build and operate an Interconnect Clearinghouse. Some of the advantages of handling national interconnection through an interconnect exchange operator are as follows:

- **Network Simplicity**: Interconnect Exchange simplifies the network interconnection architecture, in contrast with the spaghetti network architecture of the peer-to-peer interconnect scheme.

- **Optimization of number of Interconnect links**: An Interconnect Exchange system reduces the number of interconnects. Present requirement of interconnect link in any Point of Interconnection (POI) Area is N x (N-1), where N is the number of operators to be interconnected. As an example, in a city with 10 different operators, the number of interconnect links required to connect all the operators is 90. After introduction of Interconnect Exchange, the number of interconnect will drop down

to N, i.e. equal to the number of operators. This saves operators operational funds in building new links. The cost of monitoring, maintaining, and upgrading the interconnect links would also be saved when calls are routed through the interconnect exchange operators.

- **Simple, cost-effective and reliable POIs:** As any operator will need to maintain only one POI in any operational city, it is cost effective for each operator to go for most reliable and upgradeable media for POIs in each Local Area, provides much more dependable service to the end-users. The Interconnect Exchange operator is in a position to collate the requirements of all operators and plan out augmentation of POI capacities in a time bound and cost-effective manner.

- The advent of networks like 3G, IMS, and NGN and the associated services that can be delivered across these new networks are driving the transformation of core networks technology to an all IP infrastructure today.

- Interconnect exchange service awareness will enable support of services such as, VoIP, Video, rich multimedia content, messaging applications, mobile video messaging, and various data services with increasing higher quality and reliable level of service.

- IP services are critical to the continued growth especially in the area of mobile communication and the ability to interconnect these networks to help deliver those services is key to achieving that growth.

- **Developing Third Party Mobile Value Added Services:** Introducing interconnect clearinghouse improves the third party value added service provision, mobile aggregation services as well reducing the issue of non-transparent revenue share agreement which exists between content providers and mobile network operators. Content providers would have single point of connection to the mobile infrastructure for service delivery.

SERVICE PROVIDER	DATE OF FIRST ISSUE OF LICENCE
Afriwave Trelecom Ghana Limited	17th October, 2007