

**NGN Network Design & Optimization:
*The Network Operator & Service Provider
Perspectives***

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Background

- "True" (former "TelecomAsia") started off with providing fix line telephone service in Bangkok in 1992, with current almost 2 million subscribers.
- True Internet (our subsidiary) offer Hi-Speed Internet (broadband) in Bangkok.
- We have mobile GSM/GPRS services with almost 8 million subscribers.
- Recently, we have merged the pay-TV service ("UBC") into our portfolio for Convergence.

NGN Network: Our Goal

- Network to support Fixed-Mobile convergence and future services, particularly person-to-person multimedia services.
- To leverage the infrastructures towards the FMC
- A solution to all IP and converged network infrastructure
- A need to simplify network infrastructure and operations

NGN Network Design: Requirements

- Service Offerings:
 - Mobile NGN transport
 - VoIP services.
- Strategic Migration: Mobile Core Network Evolution.
- Interwork with legacy networks such as PSTN and 2G/2.5G RAN.
- IP/MPLS Backbone is implemented for optimization on the nation-wide transport.

NGN Network Design: Point-To-Ponder

- We are under concession of type: Build-Transfer-Operate (BTO).
- Network design and transformation must take regulations laid down by the regulator into consideration.
- As such, our plan to migrate the Fix Line to NGN is a conservative one rather than an aggressive plan.
- A Converged Core Network Platform to deliver convergence services is our focus at this moment and our investment strategy is market-lead rather than network-lead.

NGN Network Design & Future Steps

- Design Factors
 - Forecasted Subscribers and Traffic Characteristics
 - Targeted QoS & Security
 - Business Model
 - Service Interoperability
 - Existing infrastructure
- Network topology and architecture design
- Network element dimensioning
- IP/MPLS network design
- QoS Planning & Security Consideration
- Service Measurement and Monitoring

NGN Network Design: Architecture

- Layer-based network architecture: A separation of session handling and session transport.
- Focus on connectivity control layer, IP core network layer, and broadband access layer.
- Softswitch or Call Servers are at the center of NGN network.
- IP/MPLS Core network is a crucial infrastructure for the next generation IP-based services to transport triple-play traffic.

NGN Network Design: Topology

- The peer-to-peer model is employed for the VoIP network to interwork with existing networks such as PSTN/PLMN.
- The overlay model is deployed for PLMN migration.
- Centralized network topology is used to deploy softswitch whilst media gateway (MG) or remote MSCs (RMSC) are distributed.

NGN Network Design: Dimensioning

- Normally, we dimension network element capacity based the forecasted subscribers (upto 6 months).
- Start from a rough understanding of a macro-view of NGN traffic characteristics in terms of average call duration, BHCA, daily traffic pattern, together with number of users and their voice codec preference.
- From those inputs, we calculate traffic related capacity for each network element including type and size of interface and processing capacity.
- From the number of subscribers, we estimate the size of database and license related capacity of each network element.

NGN Network Design: QoS Planning

- Our main QoS metrics:
 - At the packet level: delay, jitter, echo, and packet loss
 - At the application level: MOS score
- We select voice codec that meet our QoS targeted including G.711, G.729, AMR(12.5 kbps).
- We ensure that echo cancellation is in place and well tuned.
- We design IP transport to meet delay, jitter, and packet loss requirement.
- NAT-Traversal function is included to ensure a smoothness of offered services.

NGN Network Design: IP Transport

- IP/MPLS is our main IP transport.
- Virtual Private Network (Layer 3 - VPN) is planned to transport NGN IP traffic on the common IP/MPLS network.
- Virtual LAN (VLAN) is employed to groups related network equipments (Private IP Zone).
- Specific QoS demand on the VPN is required.

NGN Network Design: Security

- Session Border Controller is placed between NGN and public Internet to hind our network as well as to prevent attacks such as denial-of-service.
- Firewall is placed at appropriate locations to secure proper network access and guard against attacks.
- NGN IP Traffic will be separated from others via VPN (Triple Play).
- Authentications are divided into several levels : users, employees, and engineering & operations staffs

Summary

- We are fully aware of the NGN technology and particularly the impact it has on our network evolution plan to convergence infrastructure.
- We anticipate that NGN network would constitute an important foundation for future convergence network; and this is the issue we bear in mind throughout our NGN design process.
- A new approach in separating call/session control from media transport will change the way we architect and dimension our network.
- IMS is our target model for the converged network.
- We realize that IP technology has a deep root in NGN network design in which some issues such as QoS and security become obvious and important.
- As such, the IP network and the call control must be designed to interwork harmoniously to deliver NGN services.

THANK YOU