Network Developments for Today's Telecommunications - Summary

The traditional Public Switched Telephone Network (PSTN) is a circuit switched network. Circuit switching ensures that a caller experience reliable, consistent quality of service however it also uses network resources inefficiently because usually only one or two channels (in a 30 channel system) carries information at any one time, and only limited compression can be applied before quality degradation . Unlike PSTN, the internet is a packet based network and, by the use of "packetizing" data, it uses network resources much more efficiently. It is able to support variable amounts of access bandwidth – allowing for delivery of broadband services. The flexible and efficient nature of the internet means that it would be desirable to carry all forms of traffic over it. However, until recently, Internet Protocol (IP) has not been a suitable medium for telephony traffic, as it does not support anything beyond "best efforts" or understand the system of signalling used in the traditional PSTN .

There are many forces and factors propelling both vendors and carriers towards a converged voice and data network model. For telcos with a substantial traditional network investment, the speed of any transition has to be tempered by the need to utilise the existing network equipment to the full , and gain maximum value from existing capital expenditure. We are in a phase where every new item of equipment has to pay its way - through enabling new value added services, providing cost savings, and supporting the integration of web and multimedia with voice services. For incumbent carriers this will mean a careful assessment of where existing services can be maintained (in the medium term) on a traditional network, where new services can begin to be offered on a new generation platform. The integration of support platforms on both networks will be required (note ISUP could be used to "link" traditional and next generation networks). For new entrant carriers, or those with a network coming to the end of its natural life, a fully converged network is easier to justify in the short term.

The limitations of IP are being overcome by new switches, called softswitches. Both the ATM and IP transport approaches will co-exist and have their roles in different parts of the network. ATM transport today provides a higher degree of service availability, but has its limitations. As IP transport improves, and in terms of new applications, IP will probably have the upper hand.

As alluded to earlier, the evolution to IP telephony is driven by a change in the type of traffic being carried. The increased volume of internet traffic needed to be carried over the telephone network and the need to handle this traffic efficiently and cost effectively has driven this evolution. A softswitch provides the necessary intelligence to handle converged voice and data traffic over an IP or ATM packetised environment. The role of the softswitch will become concentrated around network control functionality, and associated Media Gateway's (or Application Servers) will provide the platform for added services or novel applications in the network, such as unified messaging, click to dial, and multimedia conferencing. It is important that softswitches be compatible with existing voice infrastructure, offer existing feature sets, be highly reliable, offer a high interface density and be scalable.

Softswitches have something to offer for each point, but they need to mature further before they can displace traditional telco engineering. The large carriers have been reluctant to deploy softswitches as a complete replacement to the local exchange at present, particularly due to their limitations in a class 5 environment, which requires the continuous control of a service session throughout its duration. There is more desire today to implement softswitches in a Class 4 - transit level (e.g. for internet dial up offload), where call waiting, calling line identification and the generation of billing records are generally not a requirement. However, as the softswitch develops and Service Level Agreements (SLA) improve - and the traditional Class 5 switches require replacement, there will be a natural tendency to grow the softswitch "to the network edge". A softswitch based network will provide considerable benefits to both new and incumbent carriers. There are cost savings that can be made by carriers through

a packet based multimedia telephony service, although the cost of systems integration work with legacy support systems is significant. A rigid adherence to the old TDM structure will not lead to efficient engineering Reliability and scalability remain as problems for standalone systems, many of which are based on Windows NT, which does not offer as much reliability as is needed for carrier class applications.

Traditionally, softswitches have centred on the ITU standard for H.323. However, vendors are now offering other standard options as well (eg SIP). Interoperatability is essential for the future growth of IP telephony. Whilst most VoIP products on the market during 2001/2 are H.323 compliant, many vendors are moving towards Session Initiation Protocol (SIP), H.248 (for Media Gateway-Softswitch communication) and MCGP as a practical response to technology advancement and the marketplace. For example, as an internet protocol SIP allows much easier integration between personalised information, the web and telephony sessions. These standards will be commonplace during 2003.

VoIP is slower to develop within the Cable Operator network than with the Digital Subscriber Line (DSL) alternative. A major advantage of the cable market approach of DSL is the ability of the cable modem to provide significant levels of bandwidth for multimedia services.

Today's Telecommunications needs will be served increasingly by the use of these next generation networks comprising media gateways and softswitches. But the move to an IP based network will also enable carriers to create and deliver new services quicker, as the new network uses open application software, is centrally controlled, and does not require a full upgrade to individual switches on the network before a new service is launched. It becomes easier to add new services to the network, and customise services to particular markets

As the IP telephony services market shifts toward the higher revenue business market, quality of service is clearly emerging as one of the most important issues affecting the rate of deployment. Carriers and other service providers are increasingly able to provide some level of service quality guarantees - primarily concerning data communications network parameters. While the single most important component to quality of VoIP service is voice quality, a high quality service would also include integrated provisioning, monitoring, and auditing reporting. Most service providers report that their SLA's cover network availability. In addition several service providers also report SLA's are beginning to cover packet loss, jitter, delay, and MOS ratings (derived from one of the ITU approaches (P861, P862, G107)).

As well as telco carriers, end users need to be aware of the potential of VoIP and the next generation of networks for supporting their business. The new networks will lead to greater bandwidth availability to end users and a reduction in switch and transmission costs, than applied in the past, which will ensure a lower call cost to end users. The "SLA gap" between traditional circuit switched services, and the packet based networks of today may lead users to be wary of the transition period currently being faced. End users can take steps to ensure this "SLA gap" is not detrimental to them by working closely with carriers and modern PBX suppliers to ensure the services they receive are commensurate with the service levels that they require. Close attention to this area will pay dividends during the current transition period, and enable end users to have a clear understanding of where the risks are and where SLA's can be negotiated to mitigate against a service failure.

Finally, the next generation network market is big. Although the transition from trials to large scale deployments by carriers is slower than originally forecast, the capability for efficient voice and data transmission combined with the opportunities for further service development make the take up of a packetized network by incumbent and new entrant carriers alike essential for survival in an increasingly demanding marketplace.
The next generation market is valued at approximately $5.5 billion by 2008.