Lucent Technologies
Bell Labs Innovations

Lucent Technologies – bringing a reliable future to your GSM network

Looking at GSM networks alone, the rate of growth in both number and capacity is phenomenal. At present, the penetration of GSM in the global wireless market is around 40%, and is expected to grow to around 54% by the year 2002 (EMC World Cellular Forecasts).

This unprecedented growth is making many GSM operators aware of the limits of their networks as the traffic load on them increases. To keep pace with this traffic demand, the networks have to grow, yet any enhancements to the network must be done with minimal disruption to customer service. It's not just voice calls that are placing ever-heavier demands on the networks. The new services delivered using Intelligent Network (IN) functionality are eating up valuable capacity. Added to this are the imminent demands for data capability, starting with a significant build up of Short Message Service (SMS) traffic. Clearly, the capacity and performance of the GSM network elements will be stretched and arguably



non more so than the Mobile Switching Centre (MSC).

The MSC is the heart of the GSM network; handling calls for an array of services. Many MSCs in the market have a central core processor architecture controlling the main call processing functions.

5ESS®-20

This core processor is also expected to control multiple regional processors that perform routine tasks. The problem with this popular type of MSC architecture is that it produces internal processing bottlenecks as data is swapped between central and local processors. In addition, MSCs that have to handle Signalling System No. 7 (SS7) as well as call processing on the same processor, cause the MSC to suffer a significant reduction in call handling capacity.

If this MSC architecture is the most common way to support the call processing in a GSM network, then how will network operators work round these problems?

The best solution lies in Lucent's 5ESS®-2000 MSC. This powerful switch differs from other vendors' MSCs by utilising a fully distributed modular architecture. Instead of central processors, multiple processors and associated memory stores are integrated throughout the key functional areas of the switch. Almost all call processing in the 5ESS®-2000 Switch is performed in each of the distributed Switching Modules so there are no central bottlenecks to seriously degrade call-handling capacity.

In addition, hardware and software enhancements are handled without disrupting customer service, helping to maintain a high quality image and provide a sound basis for future growth.

With our enviable pedigree and long history in the telecommunications market, Lucent is differentiated by its ability to listen to its customers, understand their concerns and deliver solutions that don't present them with problems in the future.

This process of co-operation with our many customers fuels the ongoing development of the versatile 5ESS®-2000 Switch. This world class switch has been designed to support the full range of communications needs for network operators both for today and for the future, and provide unsurpassed reliability. But don't just take our word for it. In its 1997 Automatic Reporting Management and Information System (ARMIS) report, the Federal Communications Commission (FCC) identified the 5ESS®-2000 Switch as the most reliable of leading vendors' switches in four different areas:

- the number of minutes the switch failed to provide service per 10,000 business and residential customer lines.
- the number of incidents when the switch failed to provide service per 1 million business and residential customer lines.
- the number of incidents when the switch failed per 100 service providers' central offices.
- the number of minutes the switch was down per central office.

Apart from reliability, the 5ESS®-2000 Switch can also be distinguished from the competition by its higher growth capacity. Increases in network call handling capacity can be quickly and economically achieved using the 5ESS®-2000 MSC without the need to install new switches. Adding a new switch to a network can incur significant costs in comparison to growing an existing switch. When a new switch is needed, a variety of factors need to be addressed – there is probably a need to reconfigure the network, purchase or lease additional real estate and additional maintenance, power and support cost overheads. Most importantly, there will be a delay before this investment can be recouped from revenue generated by the additional traffic.

But is the 5ESS®-2000 MSC compatible with the rest of your GSM network? Lucent is committed to fully adopting relevant standards in all of its communications solutions. This means the 5ESS®-2000 MSC can be integrated into a non-Lucent GSM network. In addition, the 5ESS®-2000 MSC is also compatible with CDMA, TDMA and AMPS systems. In fact, Lucent is active in every major standards body, including ANSI, ETSI and the UMTS Forum.

The Lucent 5ESS®-2000 MSC offers more than just unequalled reliability, high call handling capacity and performance coupled with

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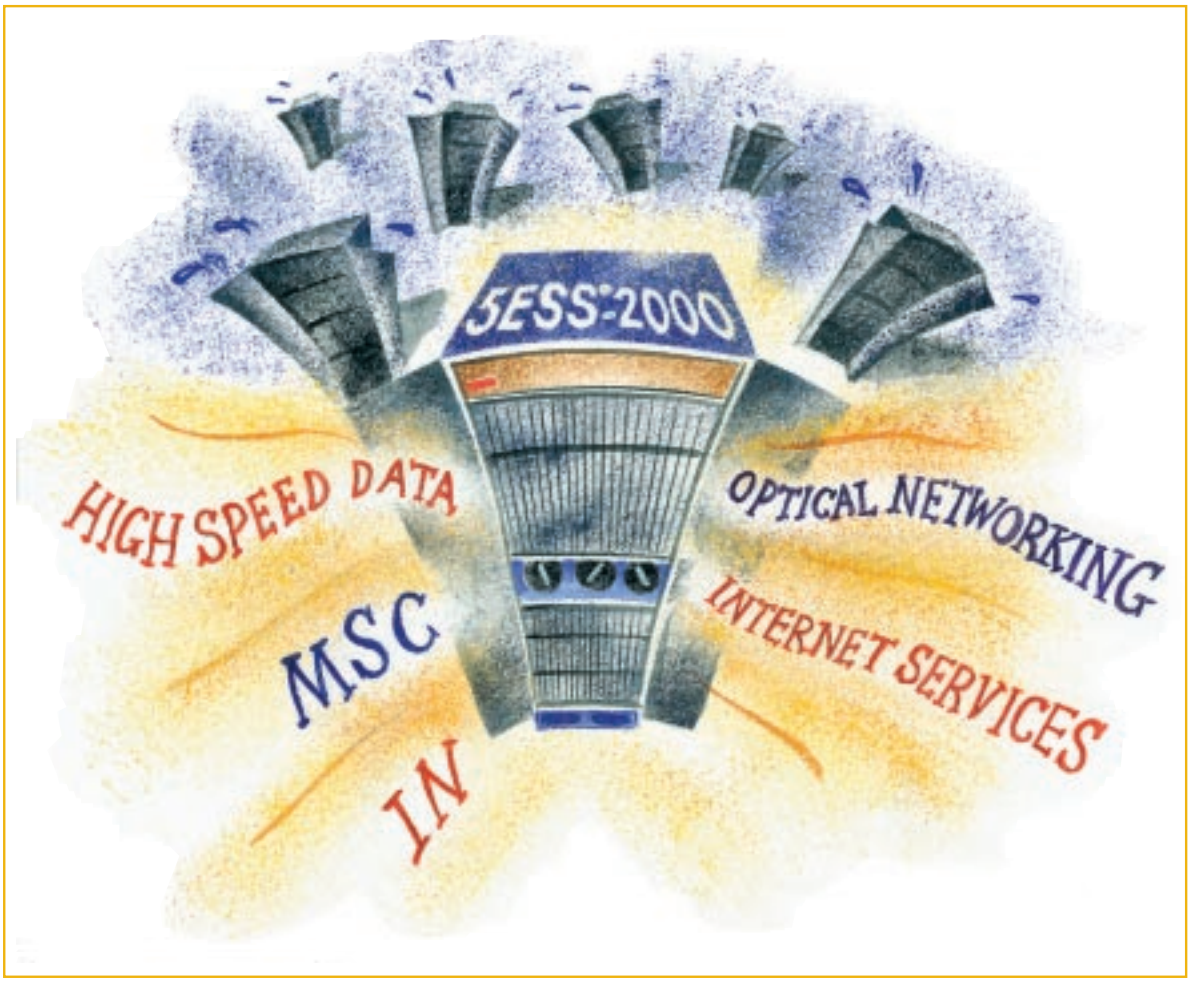
economical growth. The 5ESS®-2000 MSC can also simultaneously support multiple applications such as IN, gateway, STP, local/toll calls and tandem/transit, without suffering the significant reduction in performance of other switches.

Of all the above applications, IN will be the key to enhancing the competitive ability of a GSM operator. Increasing competition in the world's telecoms market has compelled operators to rethink their business strategy. Price alone is no longer a guarantee of low churn. Quality of service is becoming increasingly important, but one of the main differentiators that can enhance revenue and reduce customer defection is a rich portfolio of attractive services. IN is arguably the key service that will help the operator to provide a range of customer desirable applications.

To economically support this IN capability, switch vendors need to add Service Switching Point (SSP) functionality to their MSCs. However, in supporting popular IN services, such as Prepaid or Virtual Private Networks, many integrated MSC/SSP switches with central processor architectures can suffer significant loss of call handling capacity. The reason that many switches degrade is because they need more internal messages within the switch to route the IN calls. For these switches, every IN call requires digit analysis and internal routing to be performed before the call is actually routed. This is equivalent to routing through the switch about 2.5 times before finally getting the call's destination number.

In contrast, the Lucent 5ESS®-2000 MSC/SSP recognises the trigger, queries the IN database, receives the destination number and only then routes the call. This superior process removes the need for signal routing before querying the database. This cuts the number of internal messages and switch accesses needed, thus freeing up the capacity for call routing.

Lucent's close partnerships with its customers, research into future market trends and active participation in the standards bodies, drives the constant evolution of the 5ESS®-2000 MSC. As part of our commitment to Third Generation (3G) evolution, we have recently introduced a new switch module, the AnyMedia™ MultiService Module (MSM). The MSM allows the 5ESS®-2000 MSC to connect to data networks such as those



based on ATM or IP. This will enable operators to offer data services bundled with the voice capability. Applications include, modem pooling, Voice over Internet Protocol (VoIP) or ATM, Internet access, xDSL, Frame Relay or private line data. We have also introduced an STM-1e ITU-T G.703 compliant interface which allows interconnection to any vendors' SDH network and provides end-to-end VC12 management.

Lucent is firmly committed to providing the services and features customers need to compete profitably in their chosen markets. This sustained business policy has enabled Lucent to obtain new and repeat contracts for the 5ESS®-2000 Switch from major customers around the world.

With its superior capacity and call handling performance, high reliability and multi application flexibility coupled with its modular design, the 5ESS®-2000 MSC can enhance any GSM network in a highly cost-effective manner. Clearly, in comparison with other switches in the market, the 5ESS®-2000 Switch offers so much more. Call us today to find out how your GSM network can benefit from this and other Lucent Technologies' solutions.

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