In This Issue ...

The North American Numbering Plan is bursting at the seams and Cellular Carriers are complaining that its resources are not being allocated fairly. This plan, which for years has defined how calls are dialed within North America, was not designed to handle the huge number of phones now in use in major cities, particularly Los Angeles and New York City. Nor was it designed to handle new services such as Cellular. This issue of Cellular Network Perspectives examines the capacity problem and the solutions proposed by the Numbering Plan Administrator in particular for their impact on the cellular industry. In the October issue, some alternative solutions and the topic of control over the North American Numbering Plan will be addressed.

This issue also starts a series of short articles that examine the mandate and activities of the TIA TR45.2 subcommittee in more detail. This group has responsibility for all cellular interface standards outside the air interfaces, such as intersystem handoff and call delivery protocols.

We Are Moving

The office of Cellular Network Perspectives is moving. Unfortunately telephone number portability is still in the future so our phone and fax numbers have to change! The new information is:

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Problems in the North American Numbering Plan (NANP)

The North American Numbering Plan was designed in the 1940s to provide direct dialed long distance within North America. The NANP was not designed with a crystal ball, so the high rate of penetration of phones, the invention of new services such as cellular and the massive population increase in cities such as Los Angeles was not foreseen. The NANP is now close to running out of numbers, and in some areas undesirable numbering changes have had to be made in order to avert exhaustion. Because of the scarceness of numbering resources, wireline paging carriers in conveniently sized blocks.

The telecommunications industry has recognized the capacity problem for some time and earlier this year Bellcore, which has responsibility for managing the NANP, produced a report that identifies a potential solution. That report generated many responses, in some cases strongly opposed to its recommendations. The problems in the NANP and the controversial issues in the Bellcore report will be summarized in this and a subsequent article. The report, with comments, is available by contacting James Deak at Bellcore (201-740-4594).

NANP Design Restricts Growth

The NANP was designed with two major constraints in mind: the long time required to dial each digit on a rotary dial phone and the limited capabilities of telephone switches of the time. To avoid burdening local callers with long dialing times 7 digit dialing was allowed, 10 digit dialing being required only for calls to a different Number Plan Area (NPA). To make this feasible with the switch technology of the time, it was necessary to restrict the values of some digits so switches could distinguish between 7 and 10 digit dialing before all digits were received. The format of an NANP address originally was:

NYX-NXX-XXXX

(N represents a digit restricted to the values 2 through 9, Y a digit restricted to 0 or 1 and X an unrestricted digit). Due to these restrictions only 144 area codes were possible (160 less 16 N11 and N00 codes used for other purposes), each with 640 central office (CO) codes.

When some large cities started to run out of CO codes in the 1970s the restriction on the second digit of the CO code was lifted. This change affected only 7 digit dialing so required only the upgrading of switching equipment inside one NPA. The new NANP address format was:

NYX-NXX-XXXX

which allowed the same number of area codes, but 800 CO codes in each NPA.

NPA Splits and Overlays

Even with these new CO codes, some areas eventually ran out again. Each time this occurred the existing NPA was split into two. Subscribers in one portion of the area would retain the existing area code while those in the other would be assigned the new area code. Splitting an NPA, however, has a significant impact on subscribers, calling costs and telephone operations. Subscriber phone numbers have to change. Callers to the area have to be informed and have to update their telephone directories. Telephone switches all over North America have to be reprogrammed with the new area code.

Also, subscribers have to be educated about when the change will occur, under which
circumstances 10 digit dialing will then be necessary and they have to be convinced that it will have no effect on calling rates.

As an alternative to an NPA split, an overlaid NPA has been implemented in New York City. The new area code, 917, was populated with cellular phones and pagers, with other phones remaining in existing area codes 212 and 718. An overlay is particularly onerous for cellular operators, that have the extra expense and inconvenience of recalling and reprogramming cellular phones for all their subscribers.

As exhaustion of all available NPAs came close, Bellcore decided to plan for the future of the NANP, hoping to modify it in the mid 1990's to be able to handle expansion well into the next century.

The Bellcore Proposal

The Bellcore proposal suggests that the solution to NANP capacity problems lies in Universal 10 digit dialing. While eliminating 7 digit dialing for local calls does not by itself solve any problems, it does allow for the removal of restrictions on digits, with a resulting large increase in area codes and a modest increase in central office codes:

- Remove the restrictions on the second NPA digit will increase the number of area codes by more than 5 times, to 800.
- Removing the restrictions on the first CO digit will increase the number of central office codes in each NPA by 20%, to 1,000.

Some problems with this Bellcore proposal are:

- 3 more digits must be dialed for all local calls.
- CO codes are required more than area codes.
- No alternative solutions were discussed.
- Numbering resources will continue to be allocated by local exchange carriers and Bellcore.

Bellcore Vision: Forward or Back?

The Bellcore proposal is their vision of the future of the NANP. In the next issue of Cellular Network Perspectives we will discuss whether their vision is toward the past or toward the future. Several topics will be addressed:

- Alternatives to the Bellcore proposal.
- Control of the NANP.
- Conservation of numbering resources?
- The numbering needs of wireless telecommunications services such as cellular.

Glossary

| Address | The full identity of a telephone terminal. In the NANP, addresses are currently 10 digits, in the format (NYX)-NXX-XXX.
| Area Code | A 3 digit code assigned to a NPA. Currently restricted to the digits NYX, resulting in 160 possible area codes, of which 16 are lost to service codes (e.g. 911 and 800).

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