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A Proposal for Long-Term Expansion of the North American Numbering Plan (NANP) to 11 Digits

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Abstract

The North American Numbering Plan (NANP) is projected to exhaust available telephone numbering resources within the coming decades under current allocation and utilization trends. Existing mitigation strategies, including area code overlays and number pooling, extend the usable life of the NANP but introduce increasing operational complexity and user confusion.

This document proposes a long-term, uniform expansion of NANP telephone numbers from 10 to 11 digits through extension of the area code or Numbering Plan Area (NPA) from 3 to 4 digits. The proposal emphasizes backward compatibility, fixed-length numbering, and a multi-phase transition strategy designed to minimize disruption. This document is intended to stimulate discussion and does not represent the position of any standards body or regulatory authority.

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

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Table of Contents

1. Introduction

The NANP currently utilizes a fixed-length 10-digit numbering format (NPA-NXX-XXXX). Growth in telecommunications services, device proliferation, and number portability has steadily increased demand for numbering resources.

Mitigation strategies such as overlays and thousands-block number pooling have delayed exhaustion but introduce increasing complexity in routing, administration, and user experience.

This document explores a uniform expansion of NANP numbers to 11 digits as a long-term solution.

2. Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

3. Definitions

CP Cellular Provider, the provider of service for a caller using cellular telephony.

IXC Inter-eXchange Carrier - the organization that carries a call between the caller’s service provider and the called party’s service provider where the caller’s service provider does not serve the area of the called party.

LEC Local Exchange Carrier, or provider of service for a caller using a land line or VOIP service, the organization that provides dial tone and carries a call to the called party where they are within the service area of the LEC, or transfers the call to an IXC where they are not.

N versus X In the context of a telephone number, N is used to indicate a digit that is restricted to values of 2 through 9, while X indicates an unrestricted digit with the values 0 through 9.

NPA The area code, or first three digits of the 10-digit telephone number.

NPAX The new area code, or first four digits of the new 11-digit telephone number. This proposal recommends expansion of the NPA field by 1 digit and provides an expansion of the entire phone number to 11 digits.

NXX The prefix, or digits four through six of the 10-digit telephone number, or first three digits of the subscriber number. This field is to remain unchanged, but is moved to digits five through seven of the new 11-digit telephone number.

SIT tone A Special Information Tone (SIT) is a standardized, three-beep audio signal (typically 950/1400/1800 Hz) played before a recorded announcement to indicate a telephone call has failed.

Subscriber number The portion of the telephone number following the NPA or as this proposal recommends, NPAX.

VOIP Voice Over IP, or telephone service where the call initiates from or terminates via the Internet.

XXXX The last four digits of the subscriber number, or line number, digits seven through ten of the 10-digit telephone number. This field is also to remain unchanged, but is moved to digits eight through eleven of the new 11-digit telephone number.

4. Problem Statement

The current NANP faces several challenges:

* Finite NPA capacity under existing numbering rules

* Fragmentation of numbering resources due to allocation practices

* Growing operational complexity in routing and database systems

* Long lead times required for major numbering plan changes

A long-term solution should address these challenges while minimizing disruption to existing systems and users.

All feasible approaches to expanding NANP numbering capacity introduce some degree of disruption. The proposed expansion of the NPA is considered the least disruptive option, as it preserves the existing hierarchical structure of the numbering plan and minimizes changes to subscriber numbering and routing semantics.

5. Design Goals

The proposed solution is guided by the following goals:

* Maintain fixed-length numbering

* Minimize changes to existing routing logic

* Preserve compatibility with existing numbering structures

6. Non-Goals

The following approaches are explicitly not considered desirable:

* Variable-length telephone numbers

* Region-specific numbering formats

* Frequent or repeated structural changes to the numbering plan

* Solutions requiring rapid or "flash cut" transitions

7. Proposed Expansion Model

This document proposes expanding NANP numbers from 10 to 11 digits by extending the NPA from three digits to four digits.

Existing numbers:

NPA-NXX-XXXX

Expanded format:

NPAX-NXX-XXXX

During initial deployment, the fourth digit added to the NPA to form the NPAX MUST be selected such that it does not conflict with existing digit patterns used to identify the first digit of NXX codes. Under current NANP rules, the first digit of an NXX is restricted to values 2 through 9.

By selecting 0 or 1 for the additional NPA digit, the boundary between the expanded NPAX and the following NXX remains unambiguous. This allowsexisting digit analysis algorithms to distinguish between legacy 10-digit and expanded 11-digit numbers using a simple examination of the fourth digit, without requiring variable-length parsing or timing-based disambiguation.

A single value (0 or 1) SHALL be used consistently across all NPAs during the initial deployment phase to ensure uniform behavior across networks.

Example:

213-555-1234 (legacy)

2130-555-1234 (expanded)

Or:

303-555-1234 (legacy)

3031-555-1234 (expanded)

This proposal preserves the semantic structure of the number

* NPAX is still geographic.

* NXX is still used as the routing block.

* XXXX is still the subscriber line number.

The widespread adoption of overlay area codes has fundamentally altered the NANP environment. A return to strictly geographic, non-overlapping area codes is no longer practical. The proposed approach assumes the continued existence of overlays and does not attempt to reverse this trend.

The designation of 988 as a nationwide service code required the elimination of 7-digit dialing in affected areas, accelerating the transition to uniform 10-digit dialing across the NANP. As a result, this proposal does not impact legacy 7-digit dialing, as that capability has already been largely eliminated.

This approach ensures that numbering expansion occurs at the highest level of the NANP hierarchy, avoiding disruption to lower-level components such as routing prefixes and subscriber numbers.

8. Routing Considerations

Existing routing systems rely on fixed field positions within the NANP number. The proposed expansion preserves the relative position of the NXX and subscriber line number fields, allowing for minimal modification to routing logic.

Systems that perform digit analysis MUST be updated to recognize the NPAX format. This includes SS7-based switching systems, SIP routing platforms, and number portability databases.

9. Transition Strategy

A phased transition is recommended:

9.1. Phase 0: Infrastructure Readiness

Networks and systems are updated to support 11-digit numbers without public announcement. Switching systems MUST be updated to recognize and correctly route NPAX-based numbers during Phase 0.

9.2. Phase 1: Dual-Format Acceptance

Both 10-digit and 11-digit dialing are accepted.

9.3. Phase 2: User Notification

Phase 2 is implemented as two segments.

9.3.1. Segment 1

In Segment 1 of Phase 2, LECs, CPs, IXCs, and regulatory authorities MUST publicize the implementation of the expansion of the NPA to an NPAX, where the area code is expanded to four digits, and the telephone number to eleven digits. An important highlight of the announcement SHOULD emphasize that there will be no change to the subscriber number. It SHOULD also state the date Segment 2 will begin and the date that phase 3 will begin.

9.3.2. Segment 2

In Segment 2 of Phase 2, Intercept messages SHALL be imposed on callers dialing a 10-digit phone number, and such message SHALL inform callers dialing telephone numbers using the current 10-digit format of upcoming requirements. The call SHALL still complete. The message SHOULD state the date when dialing the new 11 digit number will be required.

9.4. Phase 3: Mandatory Expansion

11-digit dialing becomes required. Callers dialing the old format 10-digit number SHALL be presented with an intercept message beginning with a SIT tone and an announcement that they must dial the new 4-digit area code. The message MAY announce the additional digit that MUST be dialed. The call SHALL NOT complete, and SHALL be treated equivalently to dialing an invalid number.

9.5. Phase 4: Full Expansion

The fourth digit of the NPA is opened to all valid values, increasing numbering capacity.

10. Alternatives Considered

The following alternatives were evaluated:

* Further subdivision of number pooling blocks

* Expansion using only reserved NPA ranges (e.g., N9X)

* Variable-length numbering schemes

These approaches either provide limited long-term benefit or introduce undesirable complexity.

11. Operational Considerations

The proposed expansion is designed to minimize impact on:

* Call routing systems

* Number portability databases

* Inter-carrier signaling

However, significant updates would be required in:

* Customer-facing systems

* Validation logic

* Legacy equipment and embedded systems

12. Economic Considerations

Incremental approaches distribute cost over time but increase long-term complexity. A planned expansion incurs higher initial cost but may reduce cumulative cost and operational burden.

Early planning enables gradual transition and reduces the risk of emergency implementation.

13. Security Considerations

Changes to numbering formats may impact fraud detection systems, call validation mechanisms, and authentication processes. These impacts SHOULD be evaluated during implementation planning.

14. International Considerations

The proposed 11-digit format remains compatible with the E.164 [ITU] maximum length of 15 digits. Coordination with international carriers and regulatory bodies would be required.

15. IANA Considerations

This document has no IANA actions.

16. Conclusion

Expansion of the NANP to 11 digits represents a viable long-term solution to numbering exhaustion. Early evaluation and planning are recommended to enable a controlled and gradual transition.

17. Access to this document

In addition to the IETF datatracker, https://datatracker.ietf.org/doc/recent, copies of all versions of this document are available from the author's Github repository, at https://github.com/electric-socket/11digitdialing.

18. References

18.1. Normative References

[ITU] International Telecommunications Union, "The international public telecommunication numbering plan Recommendation ITU-T E.164", November 2010, <https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-E.164-201011-I!!PDF-E&type=items>.

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