Recommendations for IPv6 in 3GPP Standards

draft-wasserman-3gpp-advice-00.txt

IPv6-3GPP Design Team

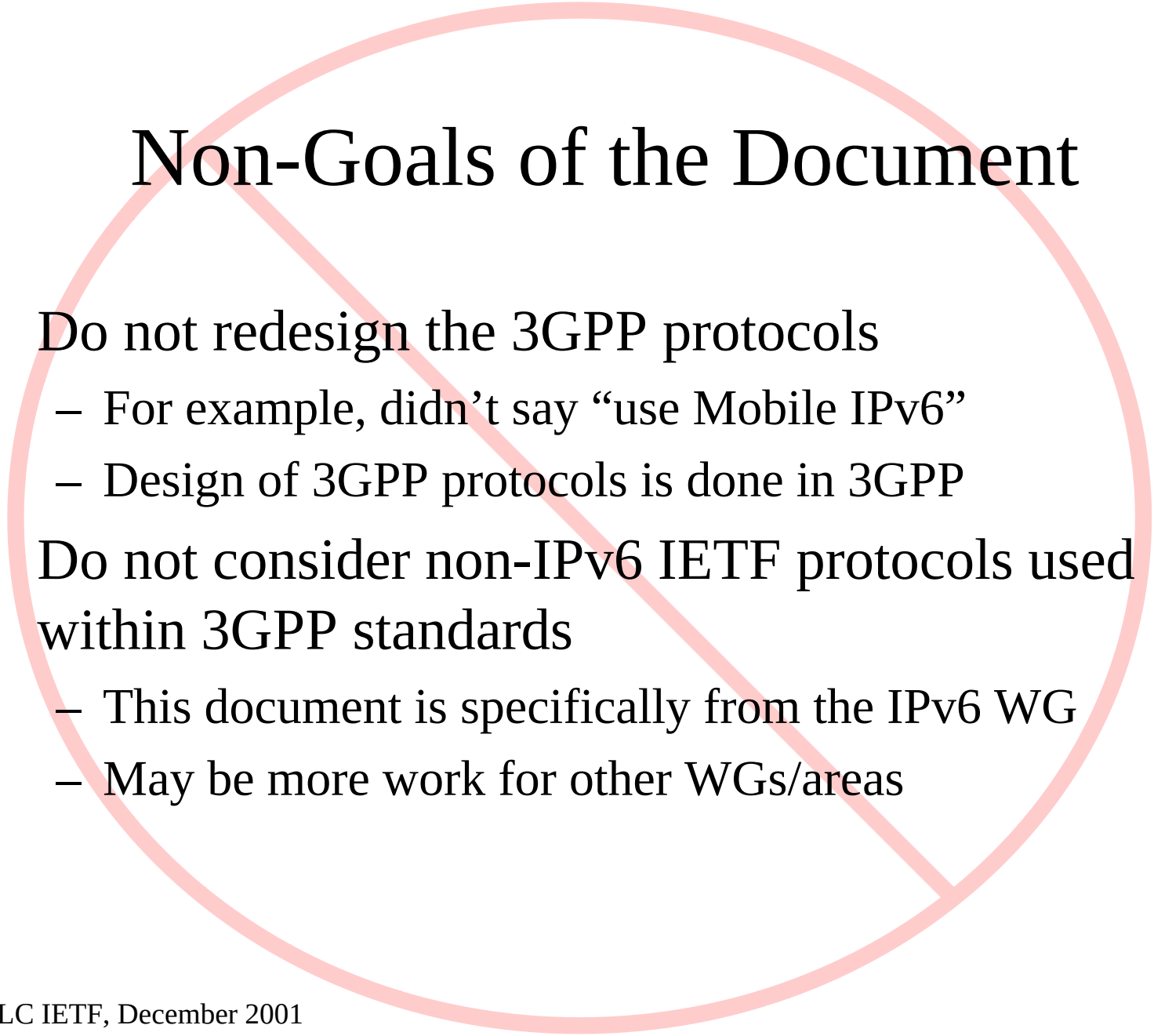
Salt Lake City IETF

December 2001

Goals of the Document

- Support the use of IPv6 in 3GPP standards
- Identify issues with the use of IPv6 within 3GPP
  - Non-compliance with current IPv6 and IPv6-related standards
    - IPv6, ND, IPv6 over PPP, IPv6 Security, etc.
  - Incompatibility with current IPv6 WG developments
- Communicate those issues to the 3GPP and recommend changes in the 3GPP standards, as necessary

Non-Goals of the Document

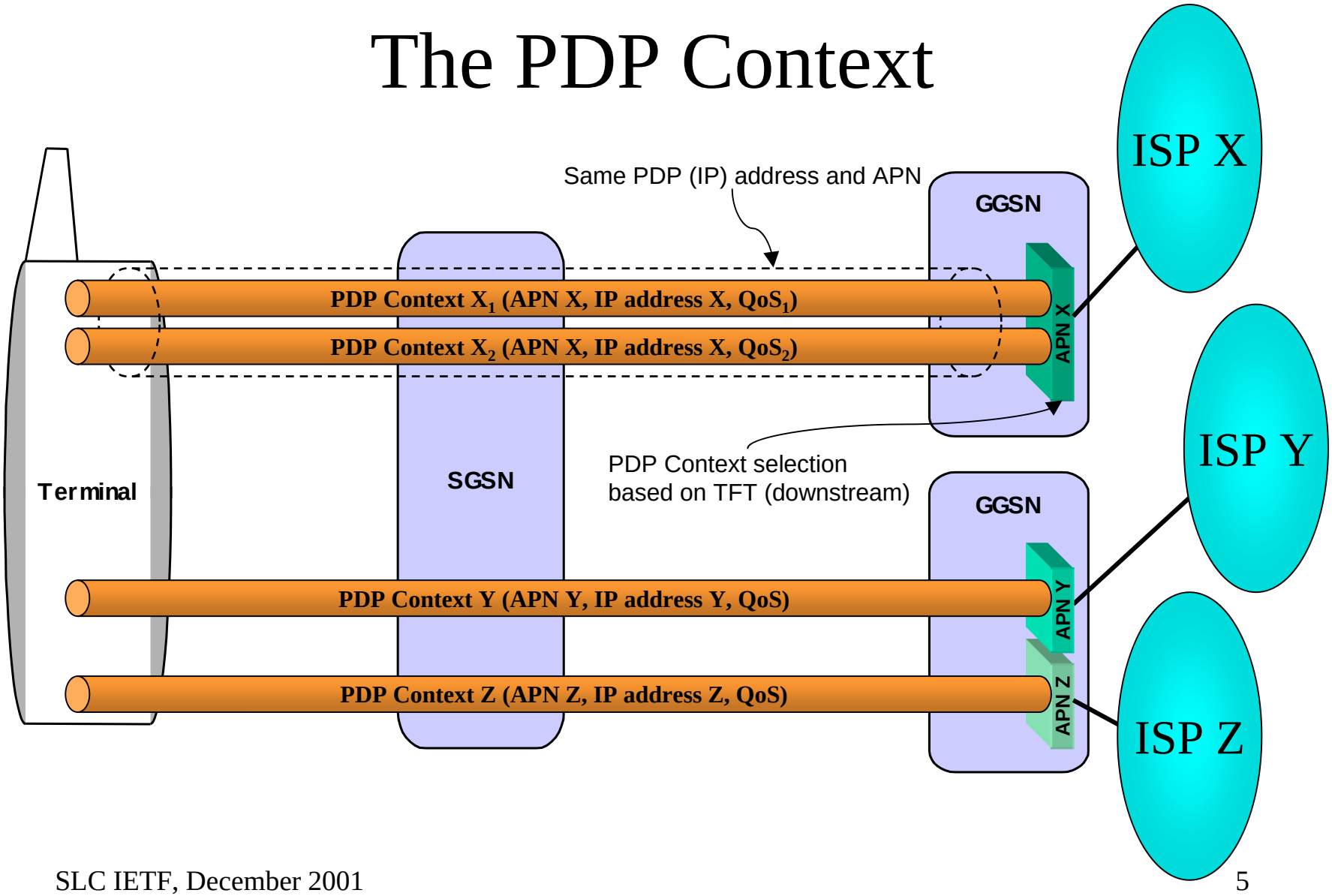


- Do not redesign the 3GPP protocols
  - For example, didn't say "use Mobile IPv6"
  - Design of 3GPP protocols is done in 3GPP
- Do not consider non-IPv6 IETF protocols used within 3GPP standards
  - This document is specifically from the IPv6 WG
  - May be more work for other WGs/areas

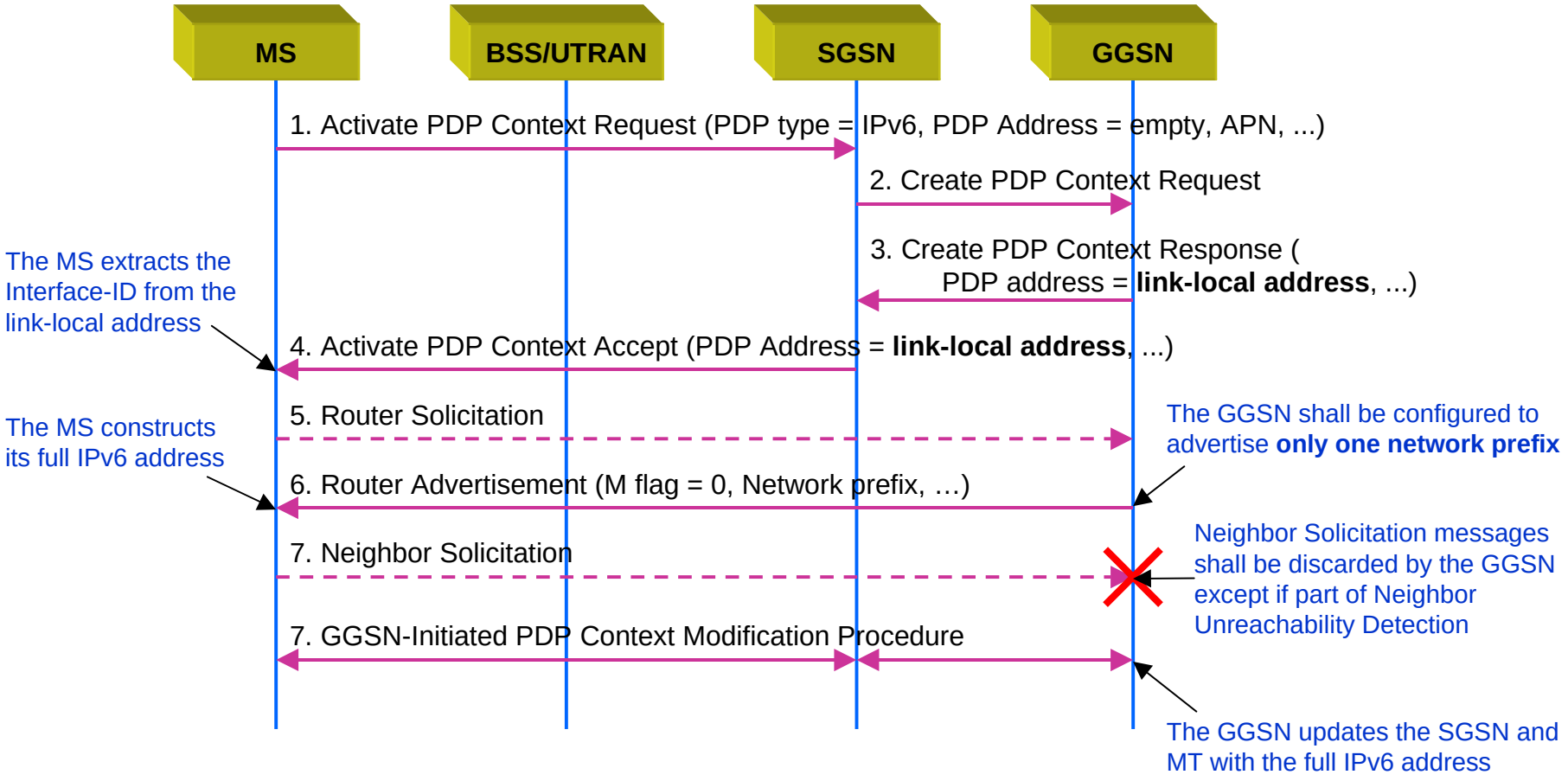
Document Overview

- Introduction to 3GPP and IPv6
  - Introduces both 3GPP and IPv6, for both audiences
  - Includes terminology and general concepts
  - Focusing on address allocation
- Three Recommendations
  - Important for compatibility between 3GPP standards and standard IPv6 implementations
  - Limited impact on 3GPP standards
- Additional Work Items for the IPv6 WG

The PDP Context

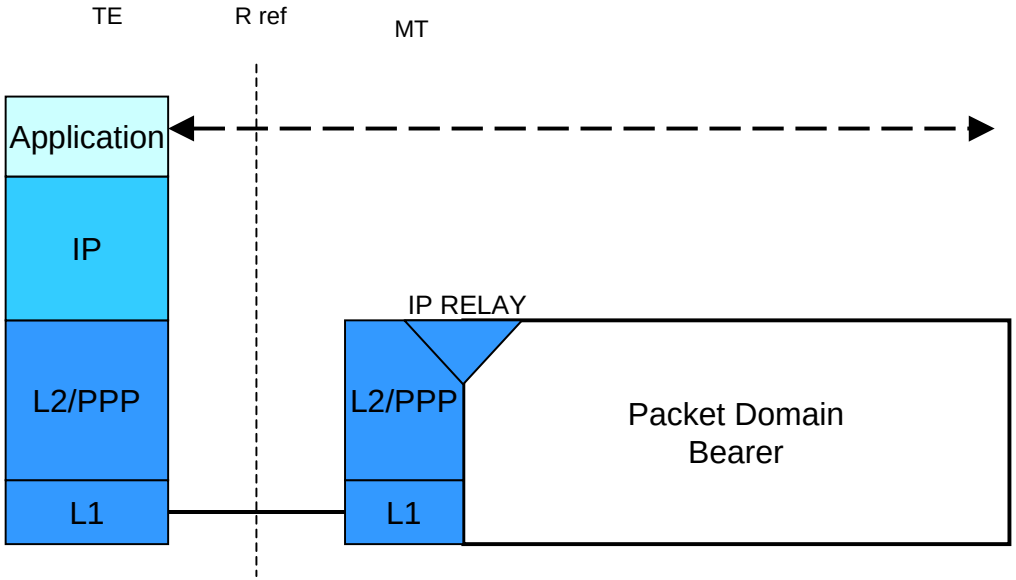


Stateless Address Autoconfiguration in UMTS/GPRS



MT-TE Configuration

IP based services



Note: MT and TE can be physically separated or physically co-located

Three Recommendations

- Specify that multiple prefixes may be assigned to each primary PDP context,
- Require that a given prefix must not be assigned to more than one primary PDP context, and
- Allow 3GPP nodes to use multiple identifiers within those prefixes, including randomly generated identifiers.

Multiple Prefixes per PDP Context

- Allows participation in site renumbering
- Site-local prefixes could be advertised on PDP contexts (3GPP links)
- Compatibility with future IPv6 work that depends upon multiple prefixes being advertised on a link
- Required Changes to 3GPP Specifications:
  - GGSNs already send standard IPv6 RAs, so will only need to support multiple prefixes in those RAs

Given Prefix Not Assigned To More than One PDP Context

- Treats a primary PDP context (and its related secondary PDP contexts) as a single IPv6 link
  - Clean separation between IPv6 and 3GPP
- Makes following recommendation practical
  - No need for GGSN to proxy DAD or keep huge state
- Further recommendation: Assign a /64 prefix per PDP context
- Required Changes to 3GPP Specifications:
  - Minimal, adds an operational restriction

Multiple Identifiers Per Prefix

- Allows 3GPP handsets and 3GPP-attached laptops to use privacy addresses
- This is a vital change to allow IPv6 laptops that implement privacy addresses to connect through 3GPP handsets
- Required changes to 3GPP:
  - A prefix (or prefix list) must be used to identify a specific PDP context, rather than a full IPv6 address

Additional Work Items for IPv6 WG

- Point-to-Point Architecture
  - Specify how IPv6 address allocation mechanisms are used over point-to-point links
  - Need to review and clarify IPv6 over PPP
- IPv6 over PDP Contexts document
  - For developers writing IPv6 over PDP Context drivers
- Requirements for Cellular Hosts
  - May feed into general “requirements for IPv6 nodes” effort
- Finalize DNS Discovery Mechanism

Feedback from 3GPP

- Emphasized need for quick action
  - To include changes in 3GPP R5, March 2002
- Raised two important issues
  - Need to reassure 3GPP operators that /64 allocations will be available
  - Will /64 allocation limit the use of 6to4?
- Clarifications regarding 3GPP technical details
- Have not stated opinion on core recommendations
  - Waiting for document to become WG item

Further Work Required

- Strengthen explanation of current 3GPP incompatibilities with IPv6 standards
  - Laptops that use privacy addresses will not be able to establish connections through current 3GPP handsets
- Supply references to reassure 3GPP operators that /64 prefixes will be available
- Determine if there are any issues regarding interaction between 6to4 and /64 allocations
- Various editorial changes and technical nits

What's Next

- Accept document as a WG work item?
  - No decisions from 3GPP until this is a WG document
  - Next 3GPP meeting is in January
- Apply edits/clarifications discussed on the list and republish as a WG draft.
- Goal is to publish as a Informational RFC

- Provide a similar document for 3GPP2?