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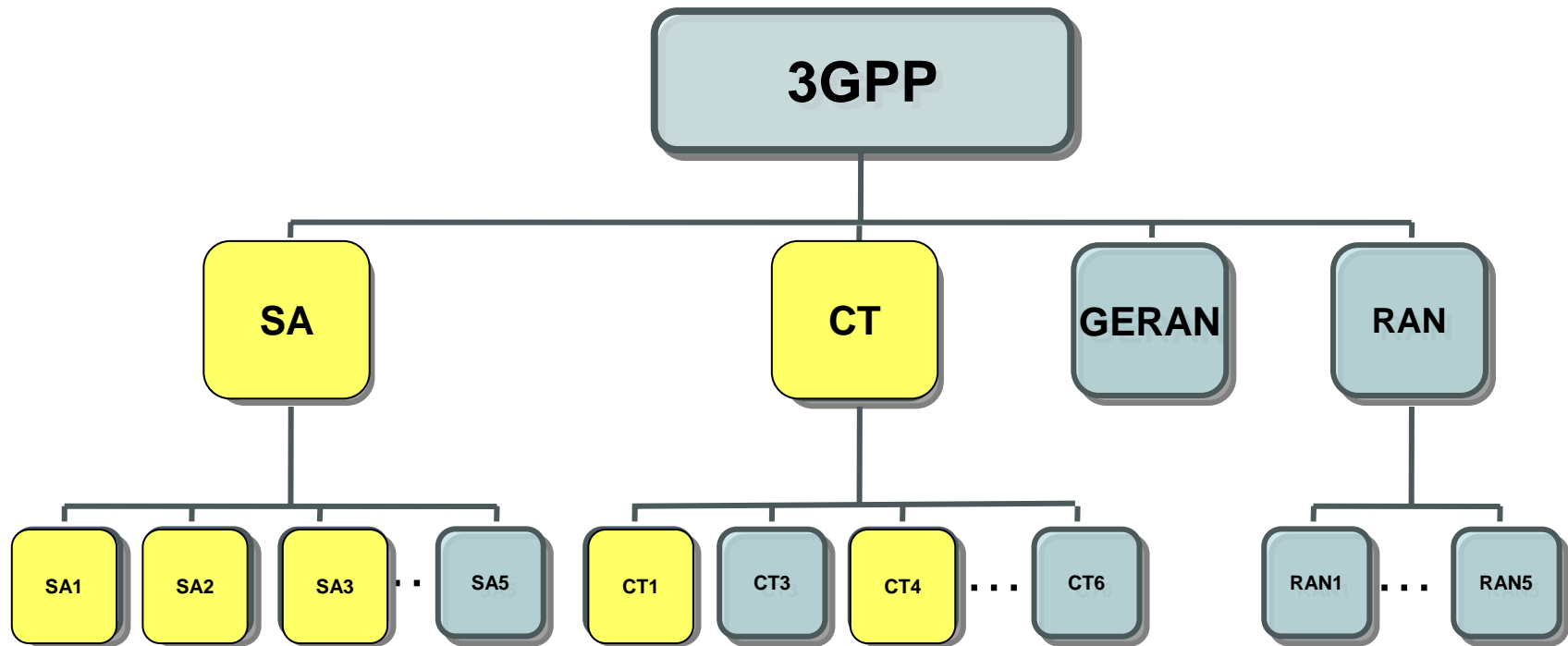
IPv6 Migration Study Item in 3GPP

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China Mobile
Nov. 2009

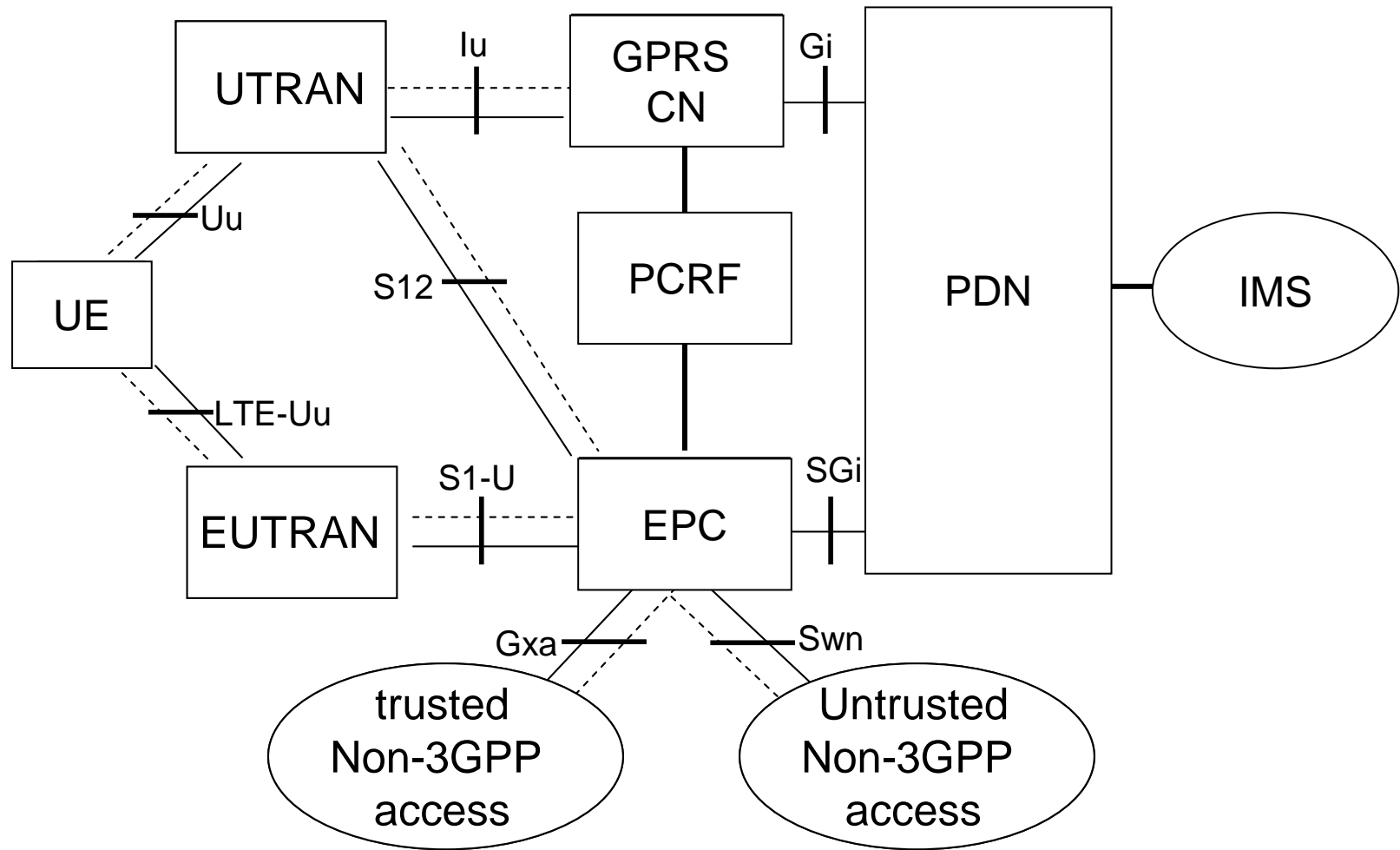
Content

- ④ IPv6 in 3GPP Technical specifications
- ④ IPv6 Migration Study Item

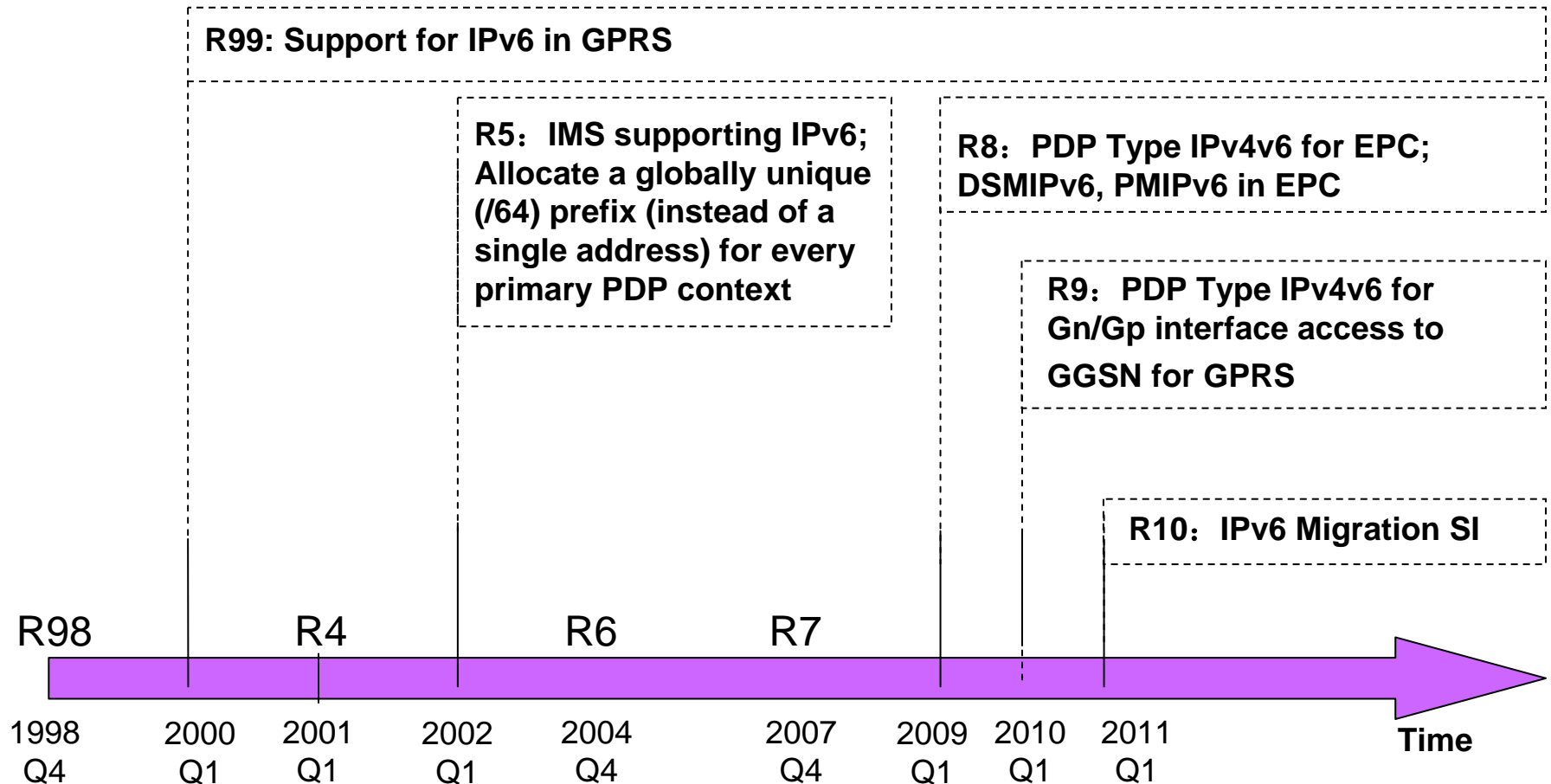
Introduction of 3GPP



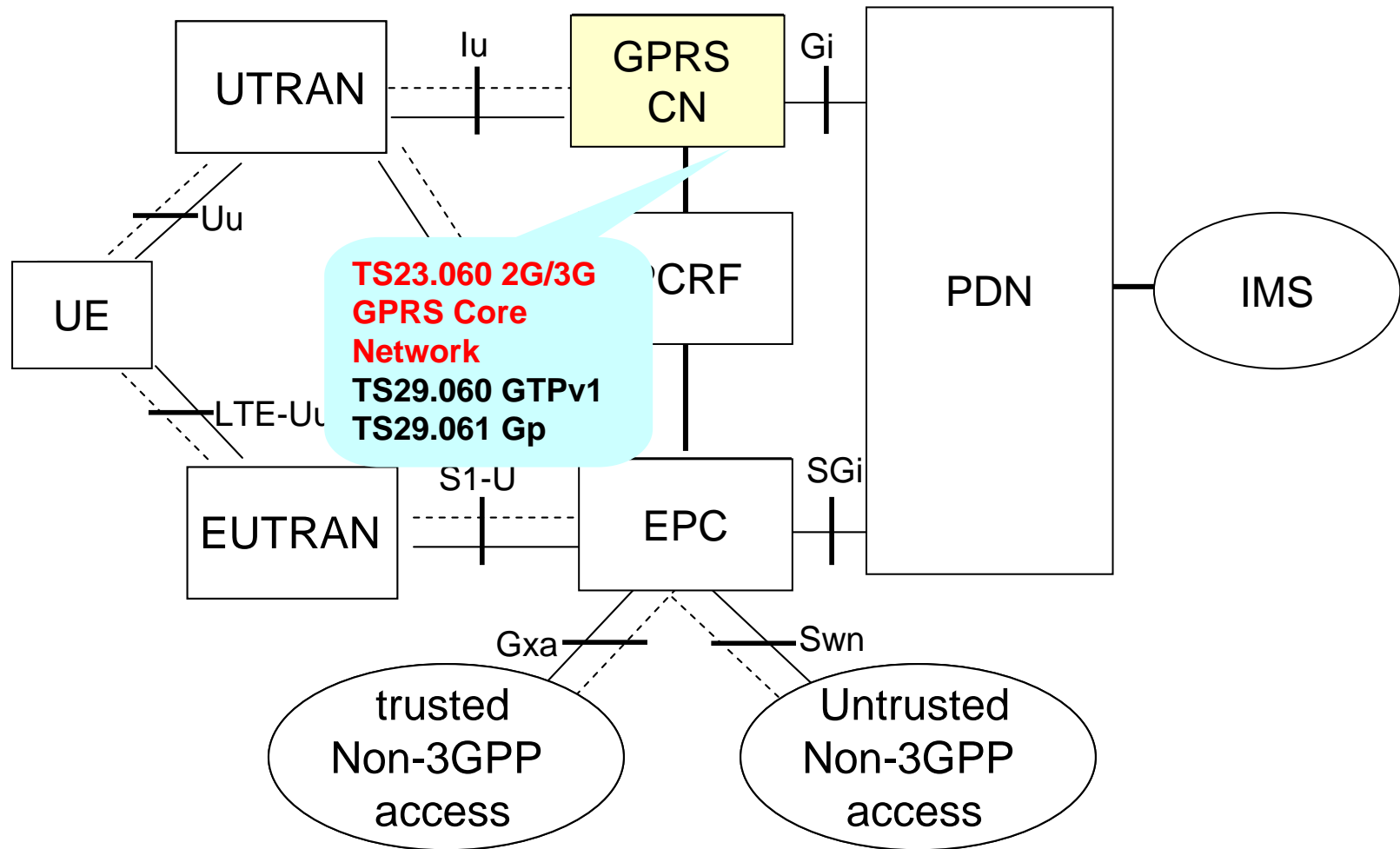
3GPP Network Architecture



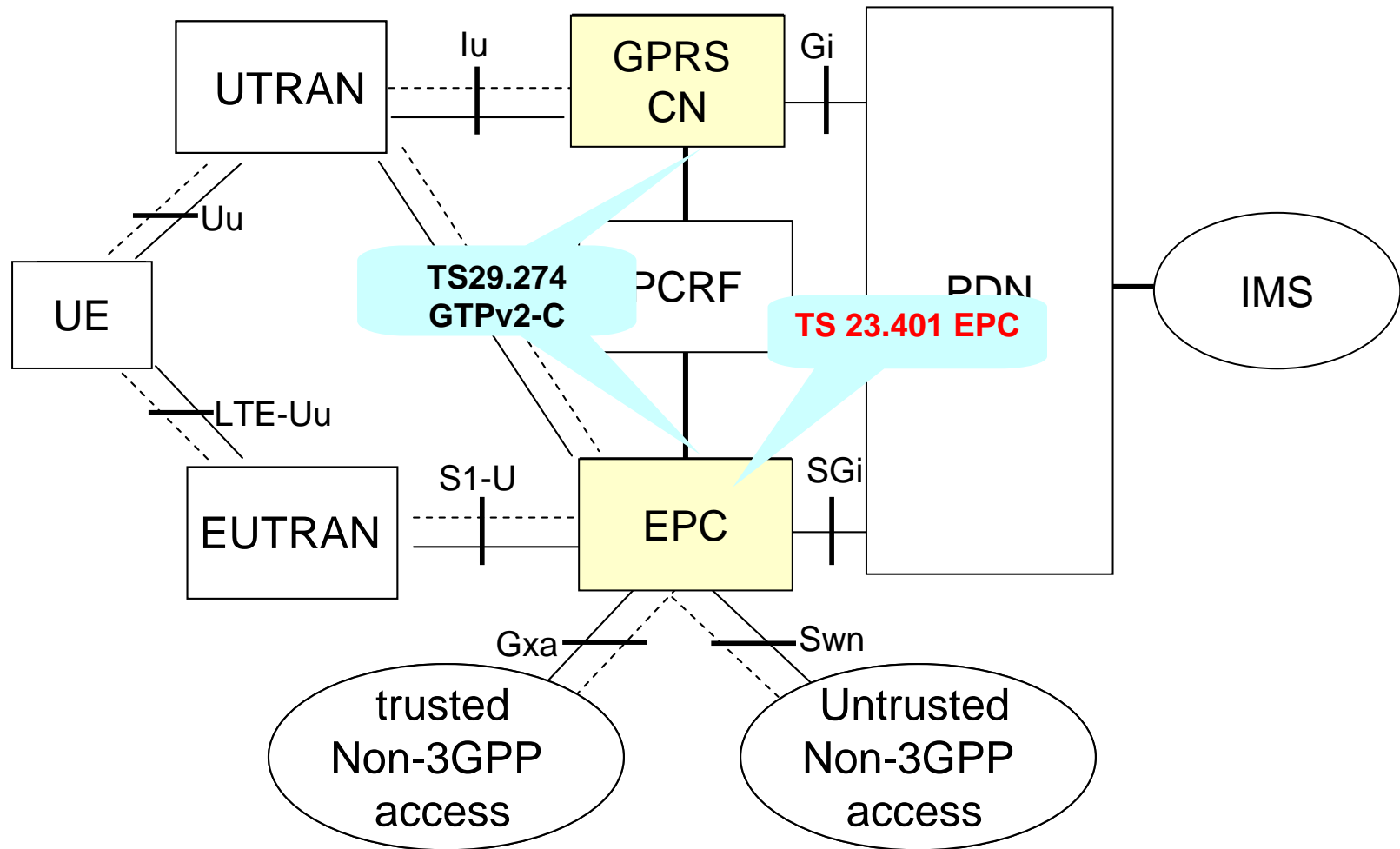
Main IPv6 functions introduced in 3GPP



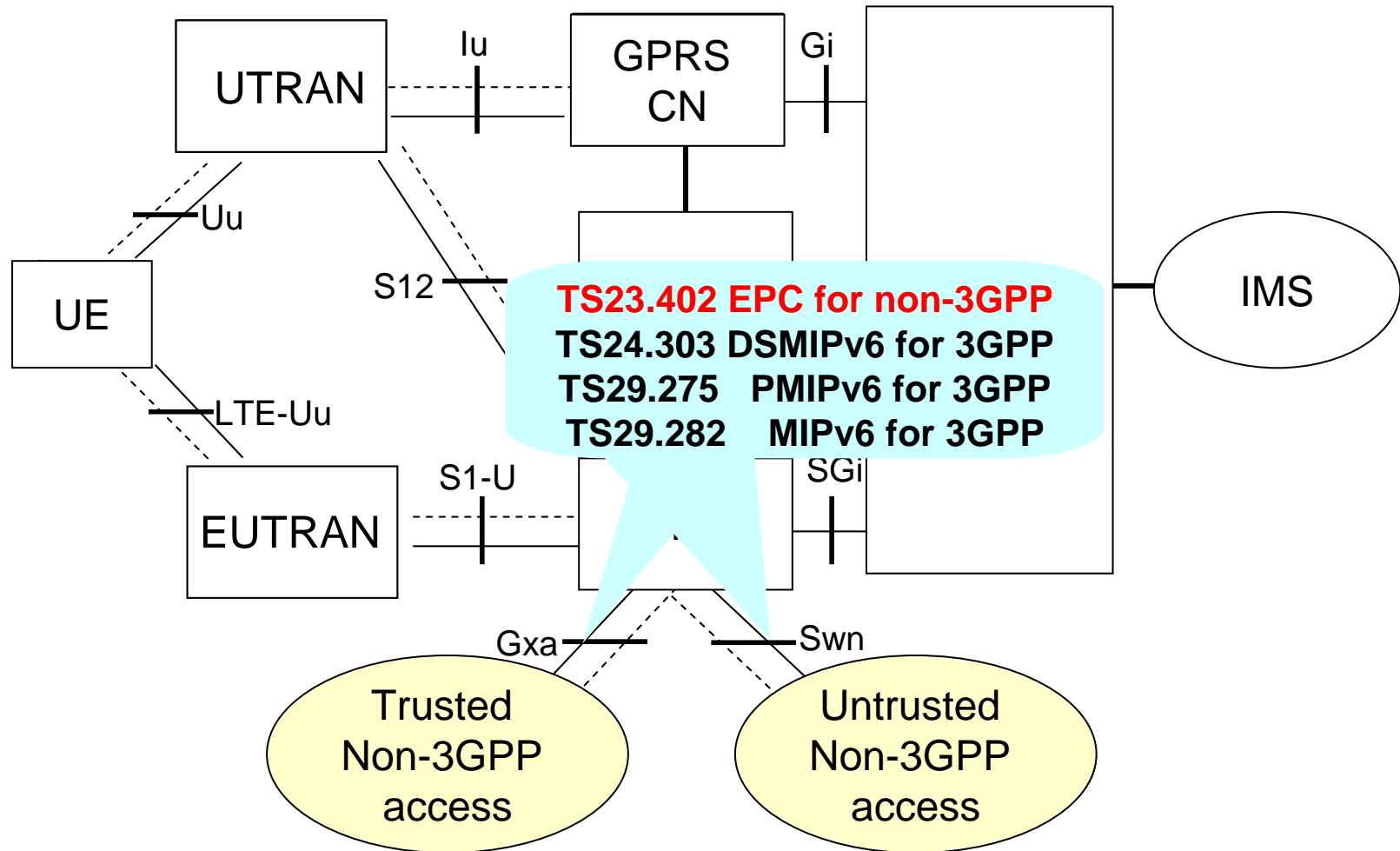
IPv6 in 3GPP Specifications



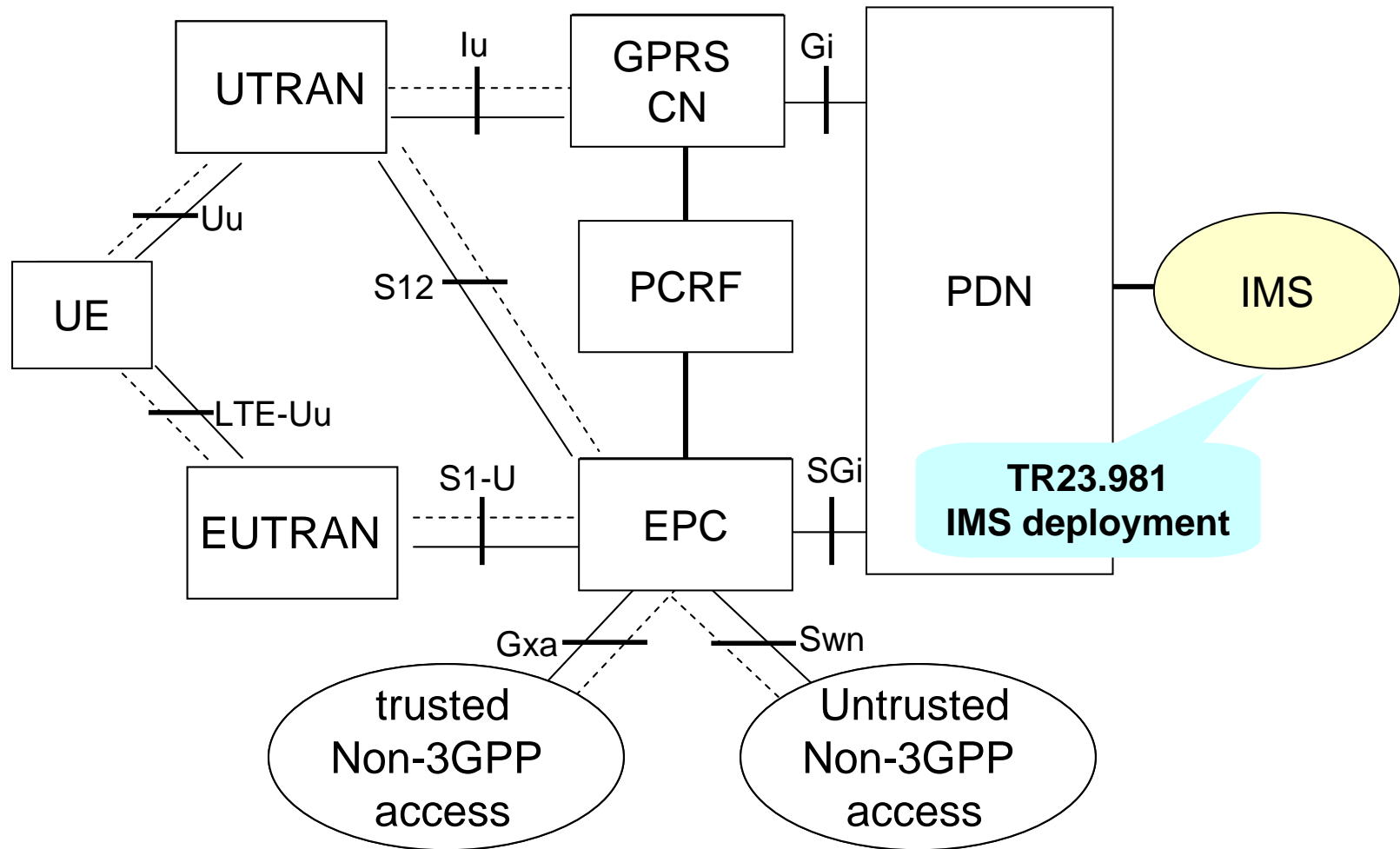
IPv6 in 3GPP Specifications



IPv6 in 3GPP Specifications



IPv6 in 3GPP Specifications



IPv6 related 3GPP Specifications

<i>Specs</i>	<i>Description</i>
TS 23.060	GPRS GTP across Gn/Gp; and GPRS enhancement for EUTRAN
TS 23.401	General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access
TS23.402	3GPP System Architecture Evolution: Architecture Enhancements for non-3GPP accesses
TS29.061	Interworking between the PLMN supporting packet based services and PDN
TS29.060	GPRS Tunnelling Protocol (GTP) across the Gn and Gp interface
TS29.274	Evolved GPRS Tunnelling Protocol for Control plane (GTPv2-C)
TS24.303	Mobility management based on Dual-Stack Mobile IPv6
TS29.275	Proxy Mobile IPv6 (PMIPv6) based Mobility and Tunnelling protocols
TS29.282	Mobile IPv6 vendor specific option format and usage within 3GPP
TR23.981	Guidance how to deploy IPV4 IMS network, some related to IPV6 migration

Content

- IPv6 in 3GPP Technical specifications
- IPv6 Migration Study Item

Justification of IPv6 Migration SI

- ④ to investigate how to migrate from IPv4 to IPv6-only with the help of transition mechanisms defined in IETF
- ④ how to handle scenarios where not all services are provided via IPv6
- ④ To consider compatibility and interconnection between different transition mechanisms
- ④ to identify and evaluate possible impacts on 3GPP network elements and terminals
- ④ to provide recommendations on IPv6 migration based on the appropriate deployment/migration scenarios applicable for 3GPP networks

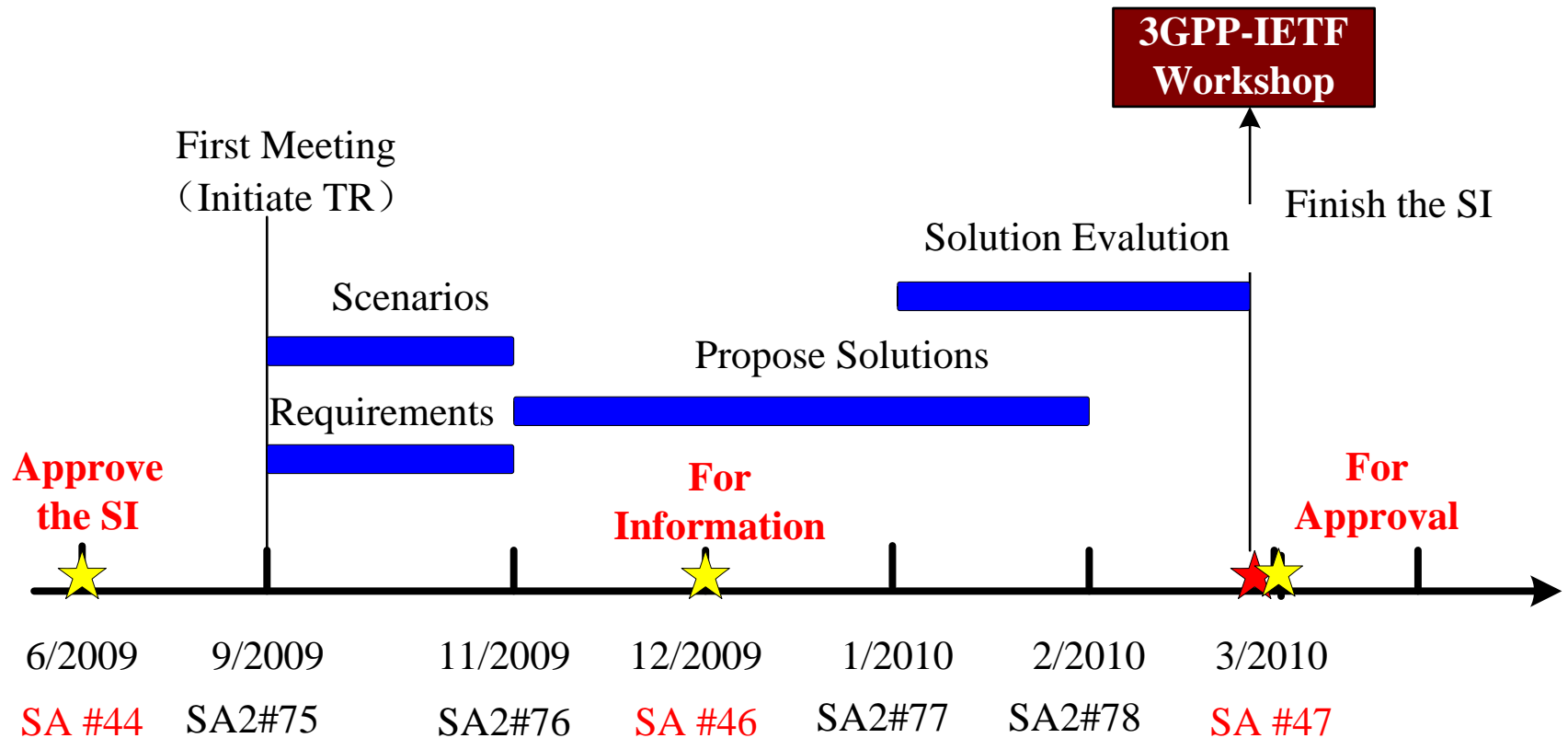
IPv6 Migration Study Item

- ④ Approved in SA2 #73 (May 2009)
 - ④ Co-Signed by 23 Operators and Vendors
 - ④ China Mobile, Verizon Wireless, T-Mobile, Orange, Telecom Italia, AT&T
 - ④ Samsung, CATT, ZTE, Huawei, Cisco, Qualcomm Europe, Nokia, Nokia-Siemens Networks, Ericsson, Panasonic, Starent Networks, Rogers Wireless, Juniper Network, Alcatel-Lucent, NEC, wwrite p/I, Motorola
- ④ Approved in SA plenary #44 (June 2009)
 - ④ The agreed contributions will be documented in **TR 23.975**
“IPv6 Migration Guidelines”

IPv6 Migration SI Objective

- ④ Identify the migration/deployment **scenarios** of interest for operators and the respective assumptions and requirements
- ④ Analyze existing **IP address** allocation mechanism for terminals and provide guidelines
- ④ Investigate IPv6 **transition mechanisms** for the scenarios identified during the study and investigate their applicability for 3GPP network, and identify the compatibility between applicable transition mechanisms
- ④ Identify any **impact** on 3GPP network elements
- ④ Provide **recommendations** on IPv6 migration and identify if any normative work is needed

Time Plan of the Study Item

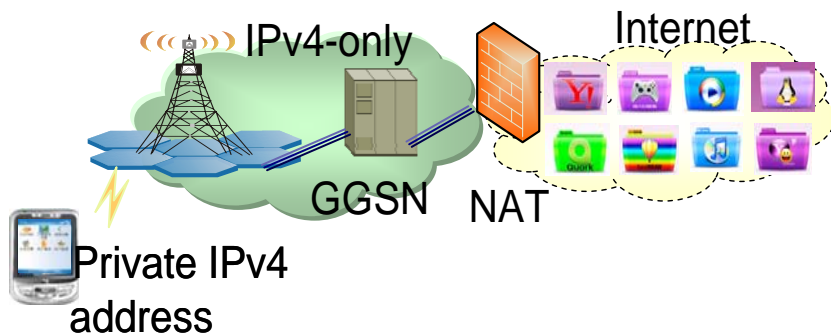


Current Status of the SI (SA2#75)

- ④ 5 P-CRs have been approved
 - ④ Including three scenarios
- ④ Existing IETF solutions have been reviewed (by Nokia)
 - ④ Dual-Stack Lite Architecture
 - ④ A+P architecture
 - ④ Protocol translation (NATPT, PNAT...)

IPv6 migration Scenario I

The scenario proposed by Ericsson: Limited IPv4 public address



- Private IPv4 addresses are assigned to the UEs, since there are not sufficient public addresses
- NATs is used to provide access to the Internet, and multiple UEs are multiplexed onto a single public IPv4 address.

There is a risk that the amount of public IPv4 addresses and ports available to the operator is not sufficient. The analysis of this scenario will describe how IPv6 can be utilized to alleviate the problems.

IPv6 migration Scenario II

Terminal IP capability

IPv4-only; DS;
IPv6-only

Assigned IP address

IPv4-only; DS;
IPv6-only

Application type

IPv4-only;
IPv6-only

Network IP capability

IPv4-only; DS;
IPv6-only

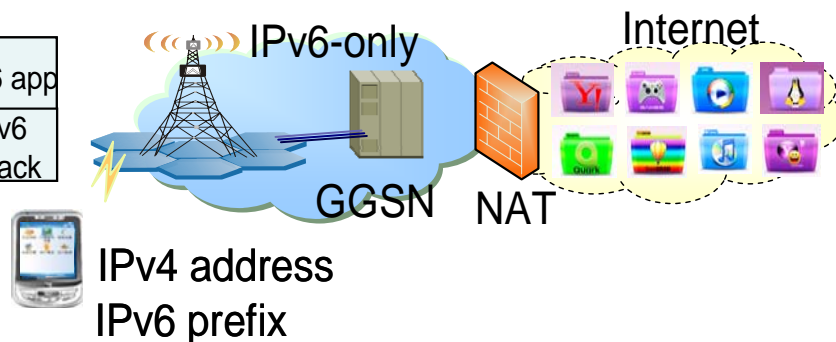
Server/peer capability

IPv4-only; DS;
IPv6-only

By China Mobile: Usage of IPv4-only applications while allowing UE to have IPv6-only access connectivity

Five elements
are specified to
build up
scenarios

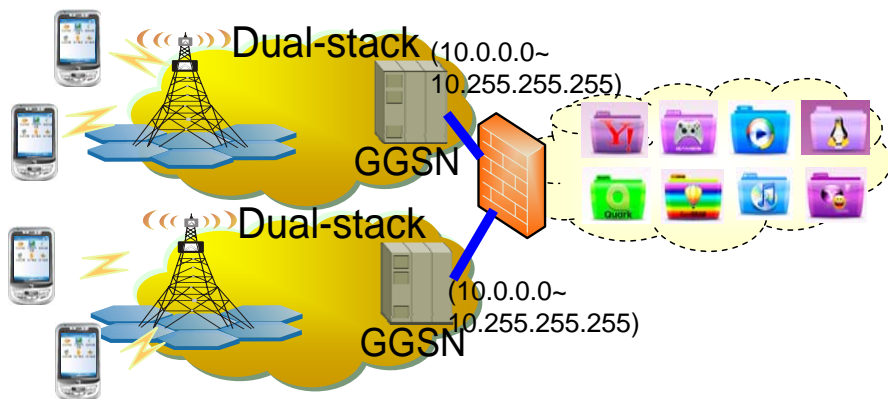
IPv4 app	IPv6 app
IPv4 Stack	IPv6 Stack



- An IPv6-only or Dual stack UE resides in a network, which may only provide IPv6 PDN connections to the UE.
- UE may be assigned with an IPv6 prefix as well as an IPv4 address.
- Conventional IPv4 applications are installed on the UE, and not required to be modified in order to communicate with remote servers.

IPv6 migration Scenario III

The scenario proposed by T-Mobile: Dual Stack bearer with private IPv4 addresses



- Operator network is dual-stack enable.
- UEs are assigned both private IPv4 and IPv6 addresses and use NAT to access Internet.
- re-using private IPv4 is performed based on each GGSN/PDN-GW, in order to avoid the private IPv4 running out

There is a risk that private IPv4 address might against IP address uniqueness, while IPv4 address serves as a identifier to a customer. The analysis of the scenario will propose a way of leveraging double role of private IPv4 addresses in order to achieve IPv6 migration

Future Work for IPv6 Migration SI

- More solutions will be proposed and evaluated
 - solutions from IETF are welcomed
- A 3GPP-IETF workshop on IPv6 will be held in San Francisco on 1-2 March 2010
- When the SI is completed, it will be decided whether new IPv6 Migration WI will be kicked off or some normative works will be done



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Thank You