

# ITU-T Second Informal Workshop on Conformance and Interoperability Testing

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Ministry of information technologies and  
communications of the  
Russian Federation



Central Research Telecommunication  
Institute of the  
Russian Federation

## **Basic approaches on NGN testing. Results of work Q.8/11 ITU-T and development plans**

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Q.3900 basic ITU-T Recommendation on NGN testing

Q.tt3, Q.tt4, Q.tt5 plans of development

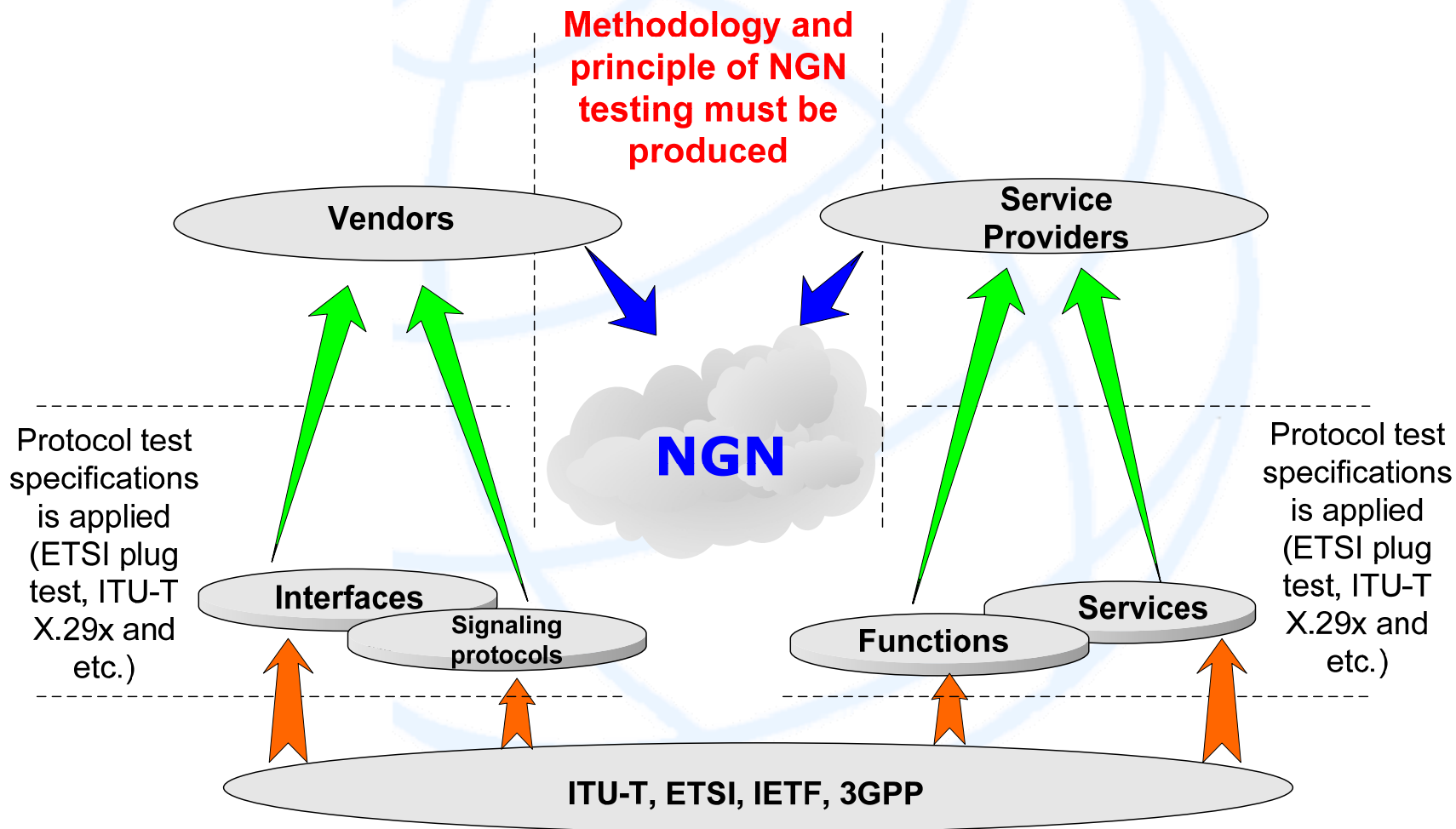
## Purpose of NGN testing

In view of the NGN networks are widely spread and internationally recognized, an essential attention when constructing such networks should be given to network functioning quality dependent on many factors, such as: applying an equipment of the different manufacturers, using the distributed networks to provide a wide spectrum of services etc.

As a result the NGN technical means testing requires some new approaches. Therefore the WTSA'04 (Brasilia, Florianopolis, October 2004) opened for SG 11 the new Question Q. 8/11.

# Importance of NGN testing

**Complex of NGN technical means testing methods will be used before realizing the NGN solutions on the real public telecommunication networks**



# Principle of NGN testing

At present the process of testing may be divided into the following stages

- **testing for conformance**
- **testing for compatibility**
- **testing for interoperability**

The new part in NGN testing

- **NGN solution testing**
- **NGN functionality testing**
- **NGN testing under pay load**

## Classification of NGN Technical Means to be tested

### Management and billing system

- **Management System (MS)**
- **Billing system (BS)**

### Application servers

- **Application Server (AS)**
- **Media server (MS)**
- **Messaging Server (MeS)**

### Call Session Control System

- **Media Gateway Controller (MGC)**
- **Proxy Server SIP (PS)**
- **IP Multimedia Subsystem (IMS)**

### Access Environment

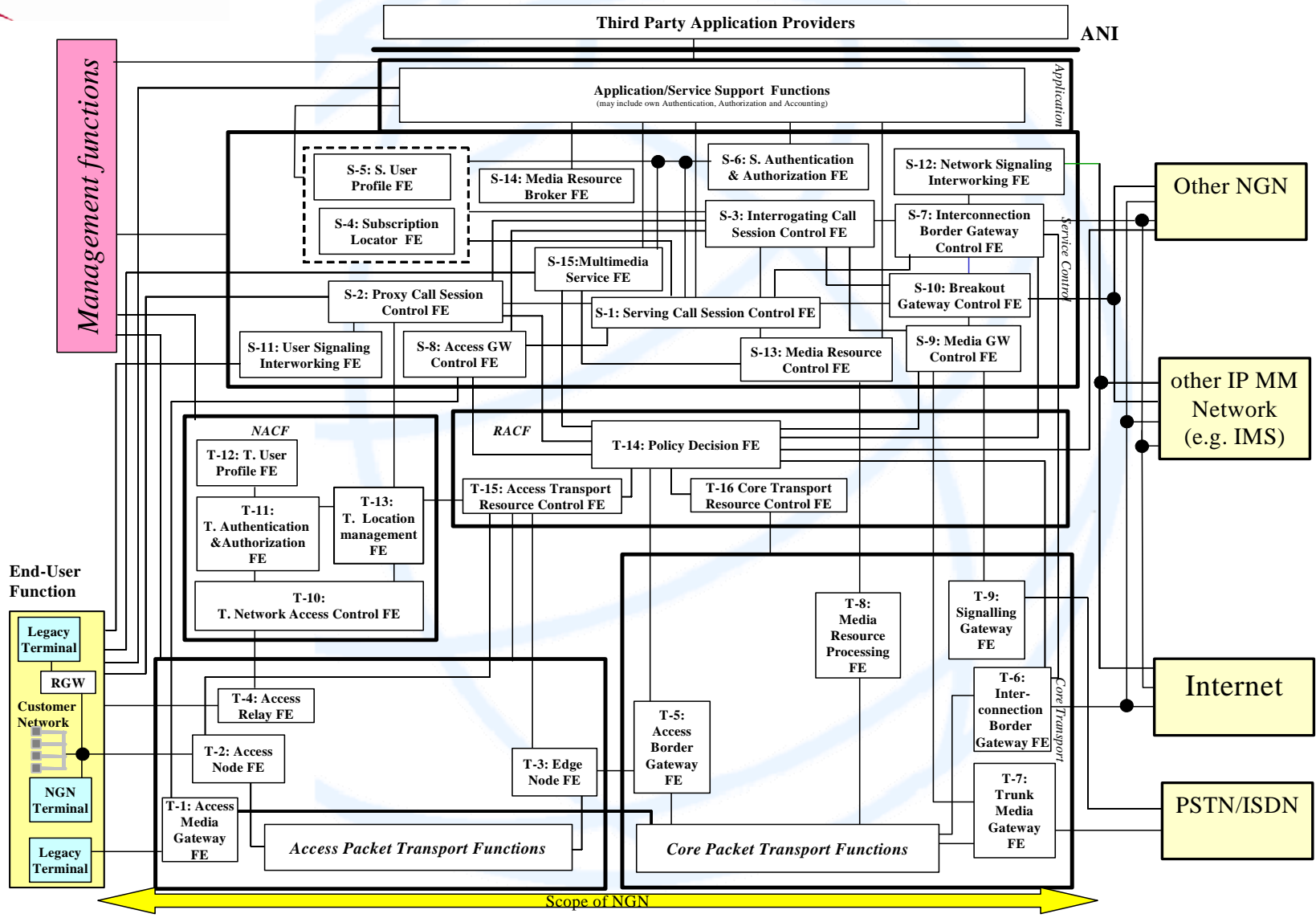
- **NGN Integrated Access Devices (NGN-IAD)**
- **Media gateway for Legacy Terminal Equipment (GW-LTE)**

### Voice and signaling transmit system

- **Media Gateway (GW)**
- **Signaling Gateway (SG)**

### Transport Network Environment (TNE)

# NGN functional architecture





## Conformance of NGN Functions to NGN Technical Means to be tested

NGN Technical means	NGN Functionality
<b>Call Session Control System</b>	
Media Gateway Controller (MGC)	S3, S7, S9, S10, S12 T10, T11, T12, T13
Proxy Server SIP (PS)	S2, S3, S7, S11, S12 T10, T11, T12, T13
IP Multimedia Subsystem (IMS)	S1, S3, S6, S7, S8, S10, S12, S13 T10, T11, T12, T13, T14, T15, T16, T17
<b>Voice and signaling transmit system</b>	
Media Gateway (GW)	T7, T8
Signaling Gateway (SG)	T8, T9
Transport Network Environment (TNE)	T5, T6, T8
<b>Application servers</b>	
Application Server (AS)	S4, S5, S6, S14, S15
Media server (MS)	S4, S5, S6, S14, S15
Messaging Server (MeS)	S4, S5, S6, S14, S15
<b>Management and billing system</b>	
Management System (MS)	<ul style="list-style-type: none"> <li>- error processing management</li> <li>- equipment configuration management</li> <li>- billing system management</li> <li>- service management</li> <li>- security management</li> </ul>
Billing system (BS)	
<b>Access Environment</b>	
NGN Integrated Access Devices (NGN-AD)	T2, T4, T3, T5, T15, T14
Media gateway for Legacy Terminal Equipment (GW-LTE)	T1, T2, T3, T4, T5



# NGN testing procedure

## Level 1

### NGN TM local testing

- Functional testing
- Load&Stress testing
- Conformance testing

## Level 2

### NUT testing

- Functional testing
- Interconnect testing
- Services testing
- Ent-to-End testing
- QoS testing
- Mobility&Roaming testing

**Model network** a network which simulates the capabilities similar to those available in present telecommunication networks, has a similar architecture and functionality and uses the same telecommunication technical means

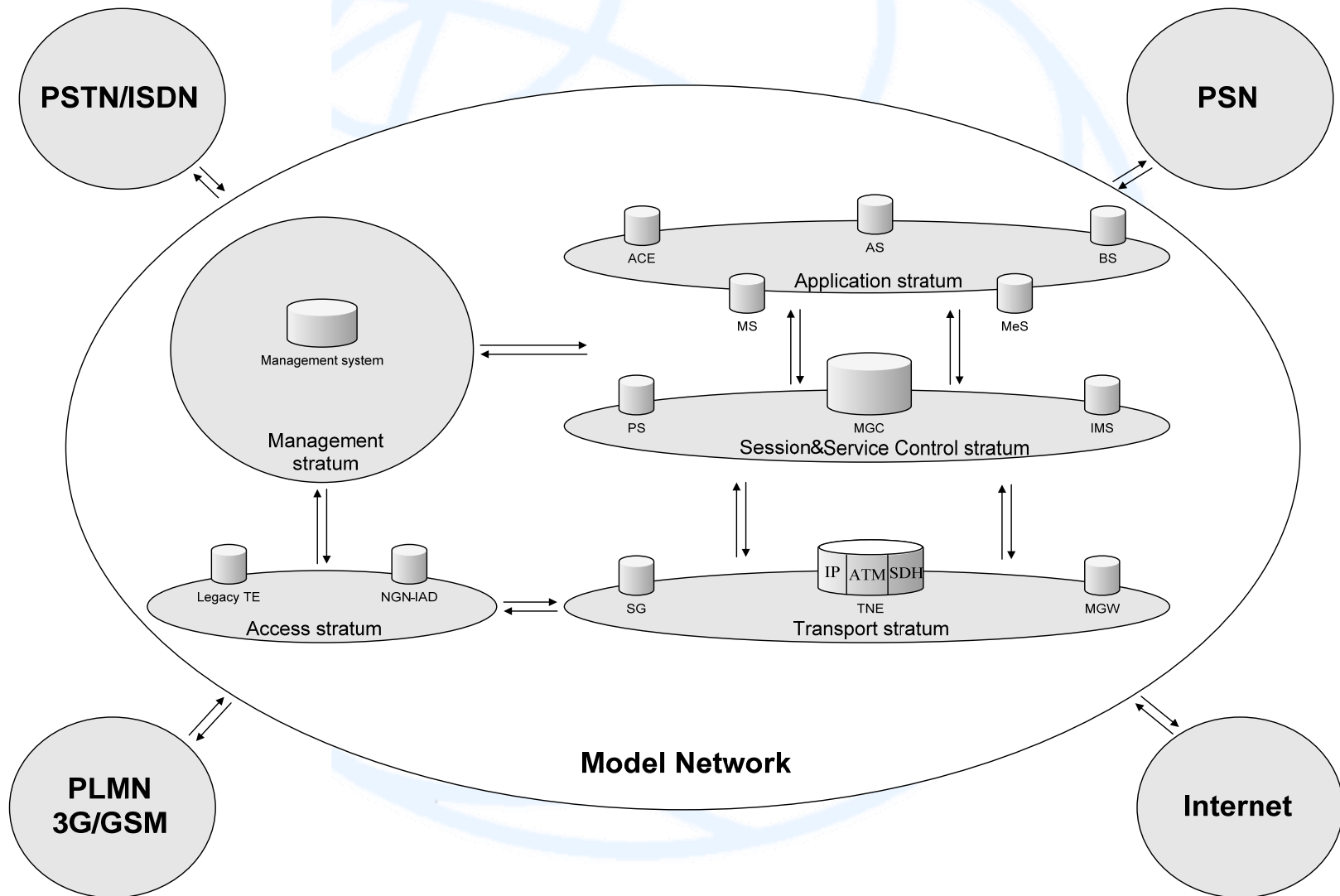
## Dedicated Model Network

is a fragment of the public telecommunication network which is not connected to other model networks and are used to perform testing for conformance, compatibility and etc.

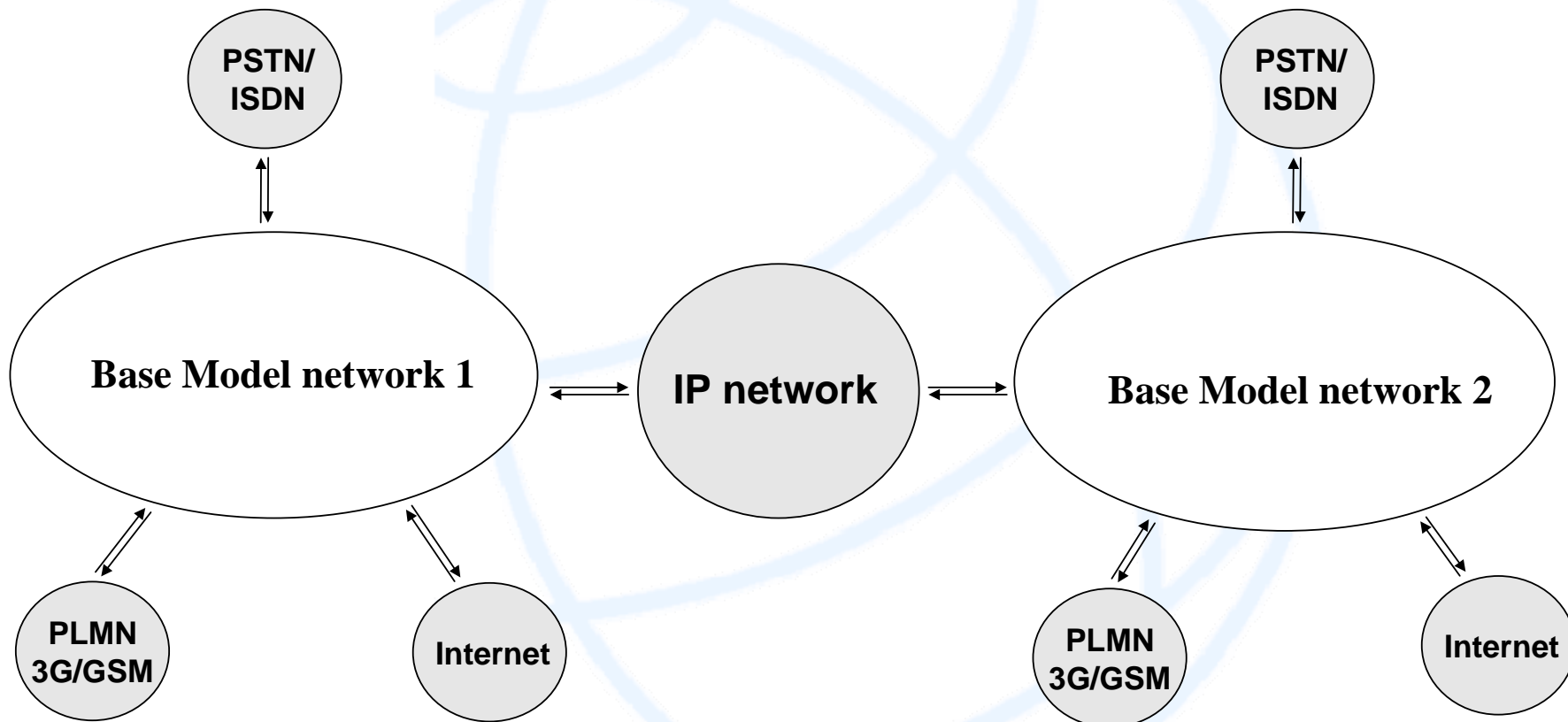
## Distributed Model Network

is composed of several model networks, two as a minimum, interconnected via communication channels and are used to perform complex tests for compatibility, interoperability, testing QoS parameters and etc.

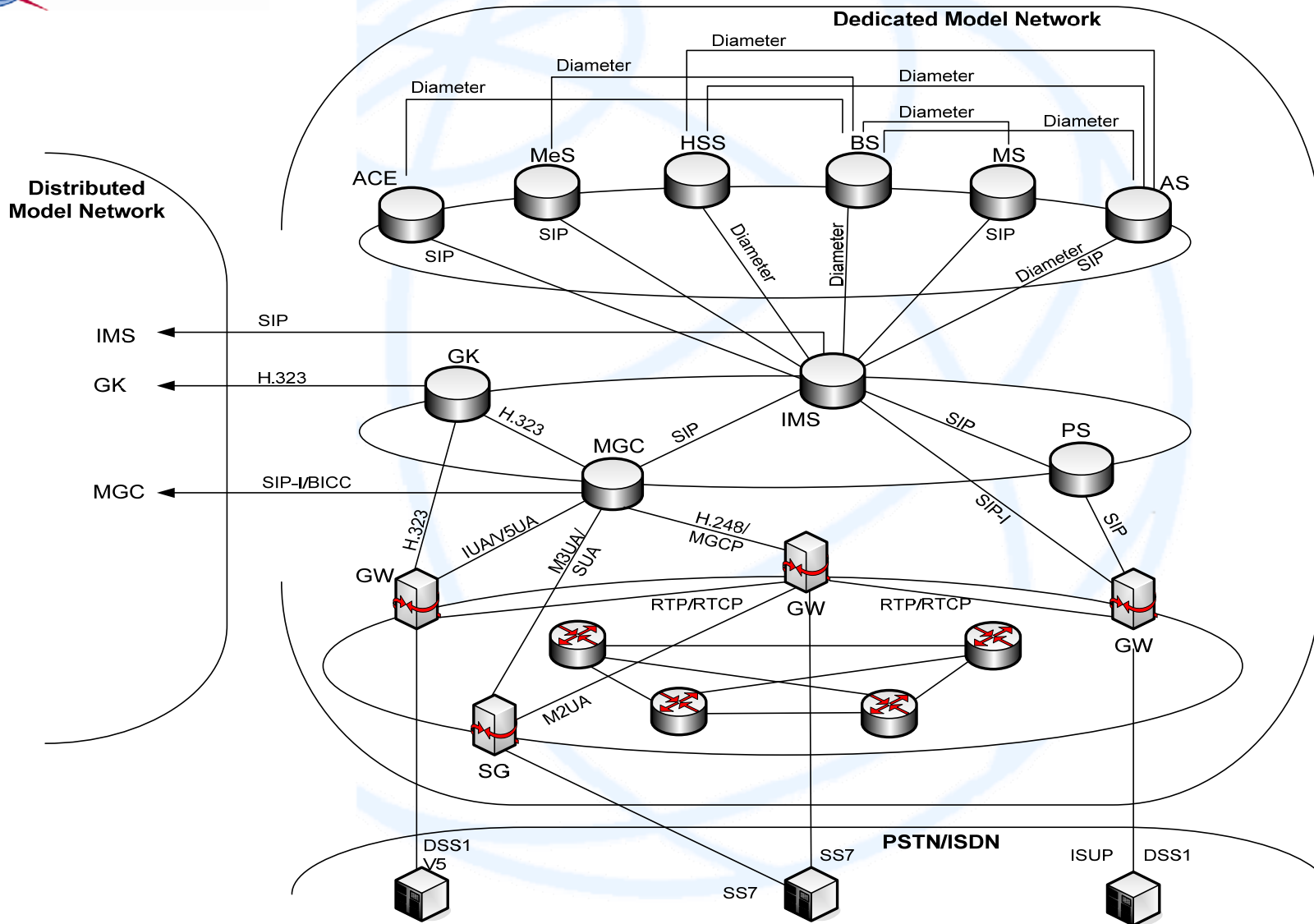
# Dedicated Model Network



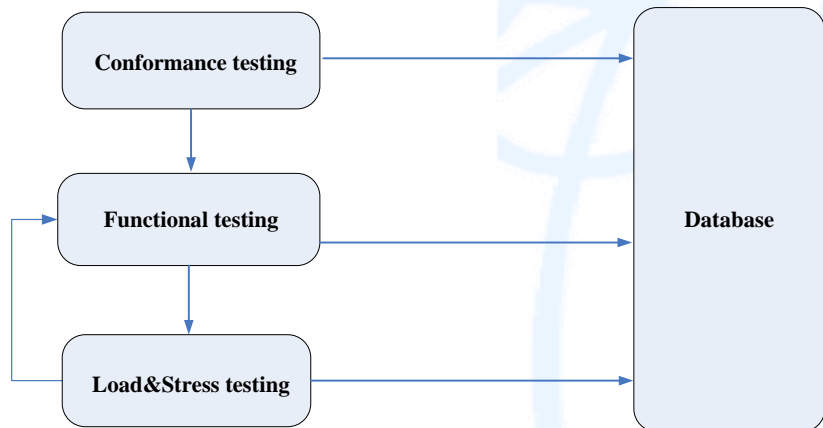
# Distributed Model Network



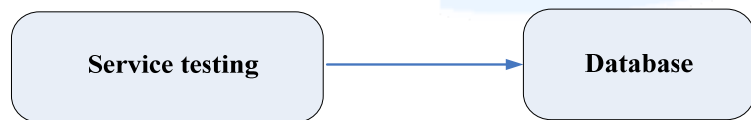
# Configuration of Model Network



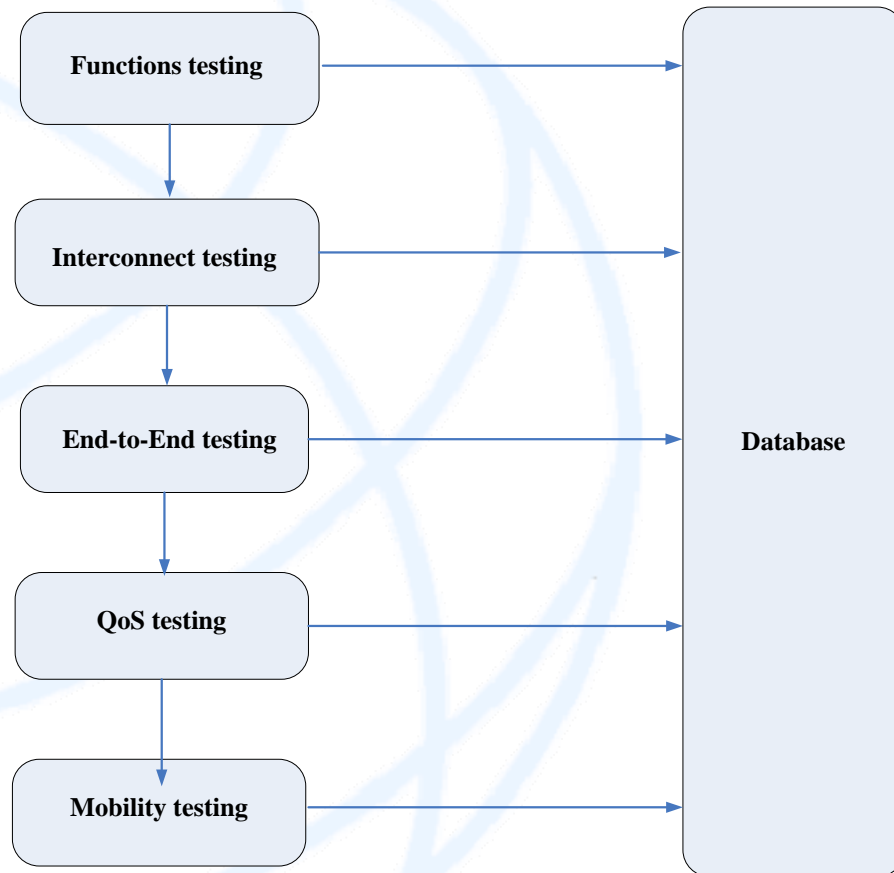
# Testing methodology on the Model Networks



**NGN TM testing**



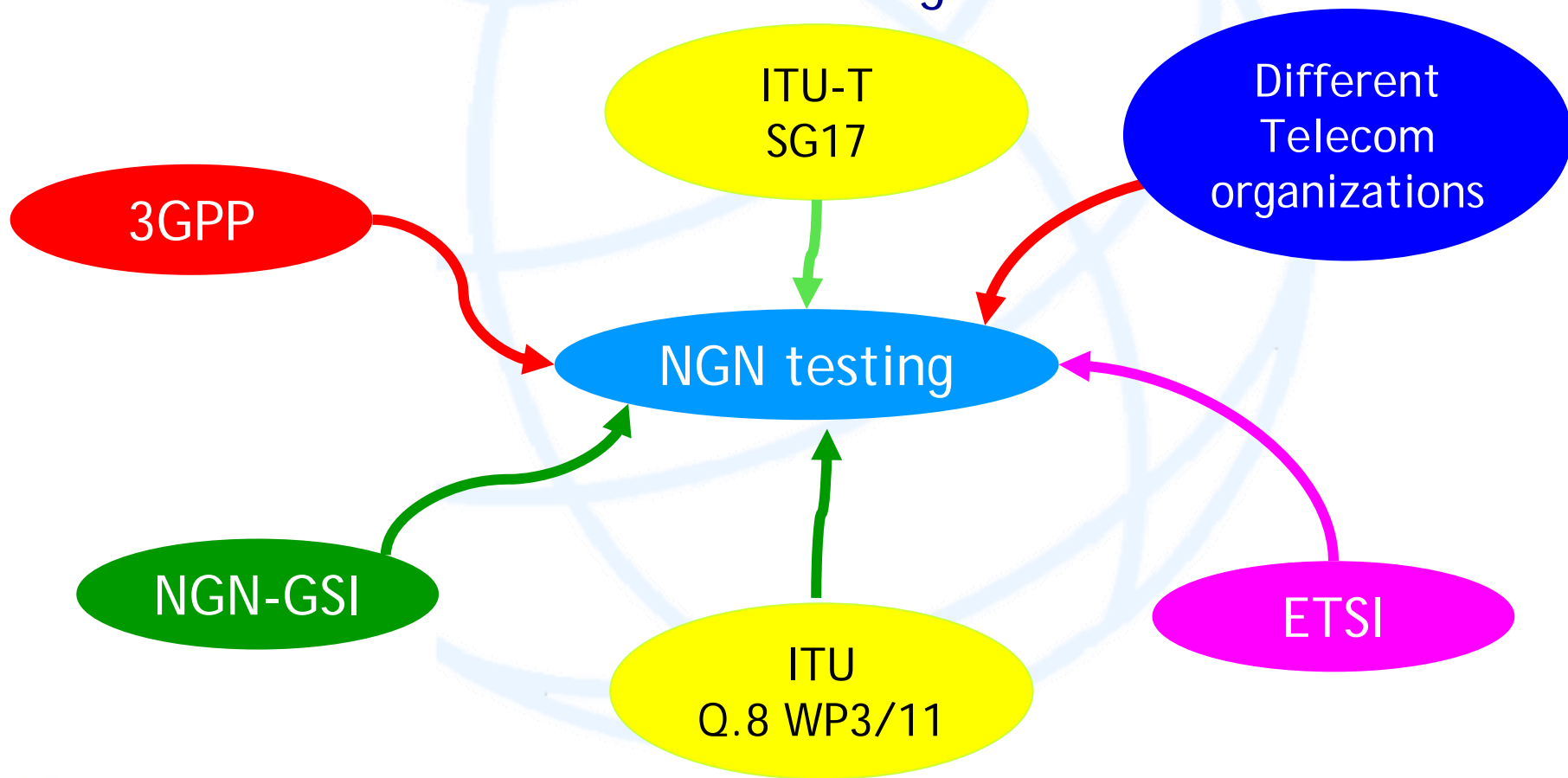
**Services testing methodology**



**NUT testing methodology**

# NGN testing standardization process

Combination and aggregation work of development standards and recommendations devoted to NGN technical means testing





## Q.8/11 role of NGN testing

**Goal - to develop the principle, methodology and set of tests for NGN technical means testing basis on the model network**

# Set of NGN testing Recommendations under Q.8/11

- Q.3900** Methods of testing and model network architecture for NGN technical means testing as applied to public telecommunication networks (approved 09/06)
- Q.tt3** Integral testing. Tests and services' distribution for NGN technical means testing in the model and operator networks
- Q.tt4** Parameters to be monitored in the process of operation when introducing NGN in PSTN
- Q.tt5** Formalized presentation of testing results
- Q.tt6** Handbook on NGN technical means testing as applied to NGN technologies to be introduced on PSTN networks

## Methods of testing and model network architecture for NGN technical means testing as applied to public telecommunication networks (approved 09/06)

### Classification of NGN functions

Classification of NGN Technical Means to be tested

Classification of NGN functions to be tested

Conformance of NGN Functions to NGN Technical Means to be tested

### Testing procedure

#### Model Networks

Purposes of using Model Networks

Types of model networks

Dedicated model network

Distributed model network

Regional model network

Testing requirements

Model network configuration requirements

Methodology of Model Networks testing

Methodology of NGN TM local testing

Methodology of NUT testing

Methodology of services testing

# Q.tt3

**Integral testing. Tests and services' distribution for NGN  
technical means testing in the model and operator  
networks**

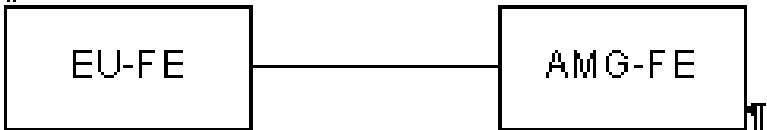
## **Detailed description of NGN testing**

- **Methodology of NGN TM testing**
- **Methodology of NUT testing**
- **NUT service testing**

## Example of NGN functionality testing

No. of test	Test description	Functional Entity	Function under test
1.1	The check possibility to provide interworking between the packet-based transport used in the NGN and analogue lines or ISDN access	T1	Access transport functions
1.2	The check possibility to support of dynamic QoS control and FireWall function for access to NGN network	T2	
1.3	The check possibility to transmit local pre-configuration information to the user equipment when necessary	T4	
2.1	The check possibility to transmit and routing traffic from an access network to the common transport network, according QoS mechanisms	T3	Edge and access boarder gateway functions
2.2	The check possibility to realize gateway between an access network and a core network	T5	
3.1	The check possibility to support FireWall function for interconnect an operator's core network with another operator's core network supporting the packet-based services	T-6	
3.2	The check of the possibility to provides	T-7	

## Example of one test for NGN functionality testing

Test No	T-1.1
Test Name	Bi-directional media processing functions
Status	Mandatory
Test purpose	The check of possibility to provide bi-directional media processing functions for user plane traffic between EU-FE and the NGN.
Configuration	
Initial condition	There is a media session established between the EU-FE and the AMG-FE.
Test procedure	Check that the EU-FE can receive and transmit any media information from AMG-FE simultaneously in the real-time mode.
Expected results	EU-FE receives and transmits media information simultaneously in the real-time mode to the AMG-FE.

## Plans of development new Recommendations devoted to NGN testing

***Q.tt4 Parameters to be monitored in the process  
of operation when introducing NGN in PSTN***

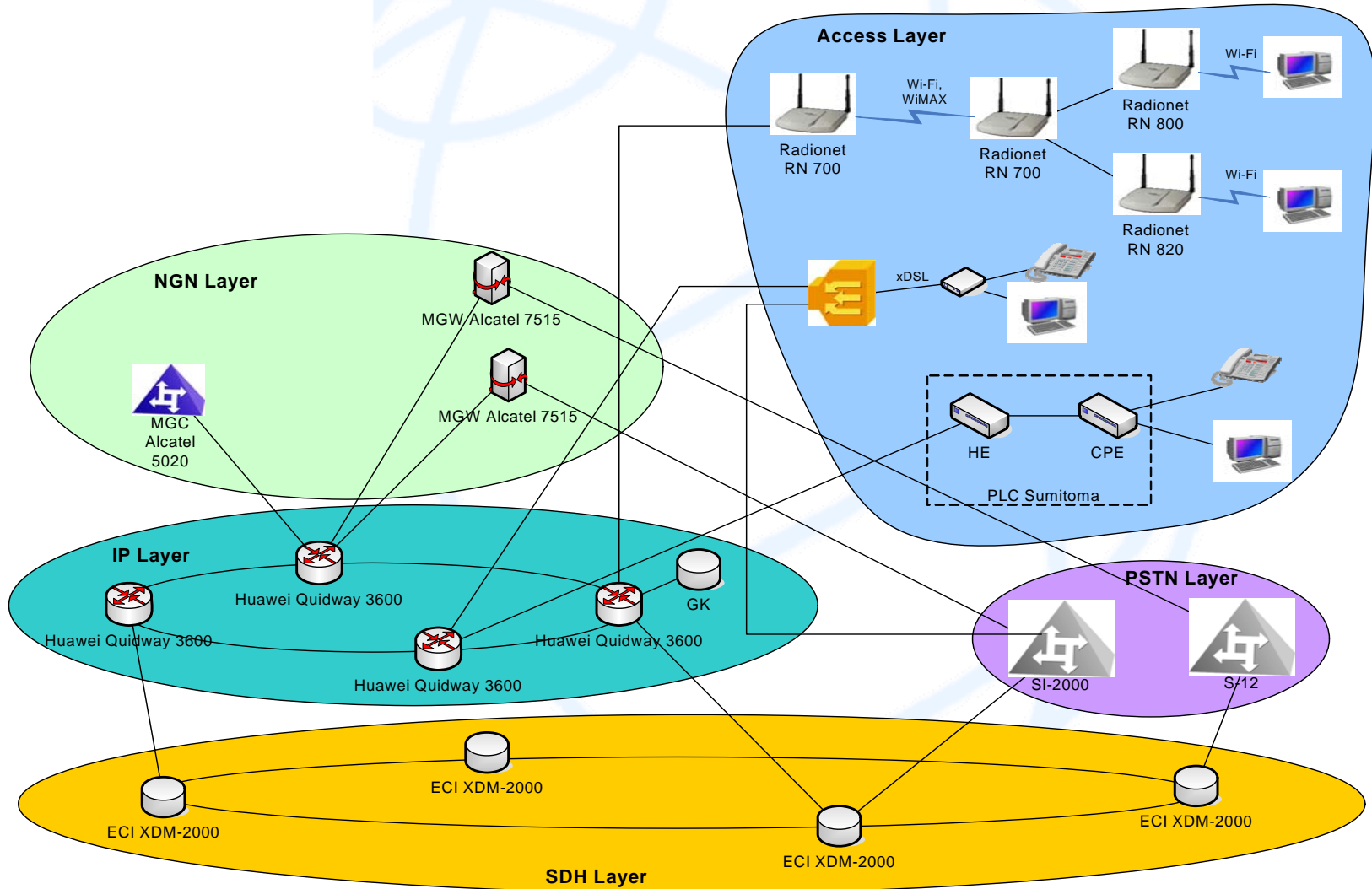
***April 2007***

***Q.tt5 Formalized presentation of testing results***

***end of 2007***



# The ZNIIS experience of model network practical realization



# Thank you for your attention



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