ITU Forum on Conformance and Interoperability Testing in CIS and Europe Regions
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Role of International telecommunication testing centers (ITTC).
Approaches of Testing Labs creation. Purposes, tasks and facilities of Testing Labs

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1. The International experience of testing center creation

The purpose of exist international testing centers

- **Verification equipment and services on operator's or ISP on conformance of internal specific standards**

- **Interoperability testing for understanding compatibility equipment which are going to implement on exist network**

- **New technologies and services preliminarily testing before implement it on the exist network of ISP (to determine optimal business and operation strategy of ISP)**

1. The International experience of testing center creation

The type of testing centers and their tasks

- ISP and network operator private labs (DT – Systemqualifizierung; BT – 21CN "ON THE NIGHT")
  Purposes: the special operators requirements testing for realizing services, interoperability testing

- Testing places for network operator community (Technische und betriebliche Fragen der Nummerierung und Netzzusammenschaltung)
  Purposes: testing on conformance global requirements of community, interoperability testing

- International testing places of standardization organization (ETSI PLUGTESTS, ITTC end etc.)
  Purposes: conformance testing on international standards and recommendations

1. The International experience of testing center creation

The International approach of equipment standardization process

- Special network operator requirements development to interfaces, etalon points and parameters of protocols for providing on the exist network the new services

- Development RFP, which include all points from network architecture, set of the equipment and functionality till protocol realization and transmitted messages include call flow (RFP – 300-400 pages)

- In case if a new services are appear which does not standardized by ETSI or ITU a ISP launch the process for standardization thought ETSI the interfaces and services with purpose to reduce costs of equipment for European network operators

- Development special program and test specifications

1. The International experience of testing center creation

The International approach of equipment testing process (traditional approach of implementation equipment on ISP networks)

- **Preliminarily selection of equipment on global criteria (type of equipment, performance, scalability, state of distribution, reservation, stability and etc.) and realization of given network functionality**

- **Preparation of network model on winner vendor under developed RFP, checking the equipment, completion of equipment under operator's requirements and equipment completion for compatibility with exist operator's network equipment (patches for Software)**

- **Preliminarily testing include services testing – as a product and development operation and business process product implementation to the telecom network**
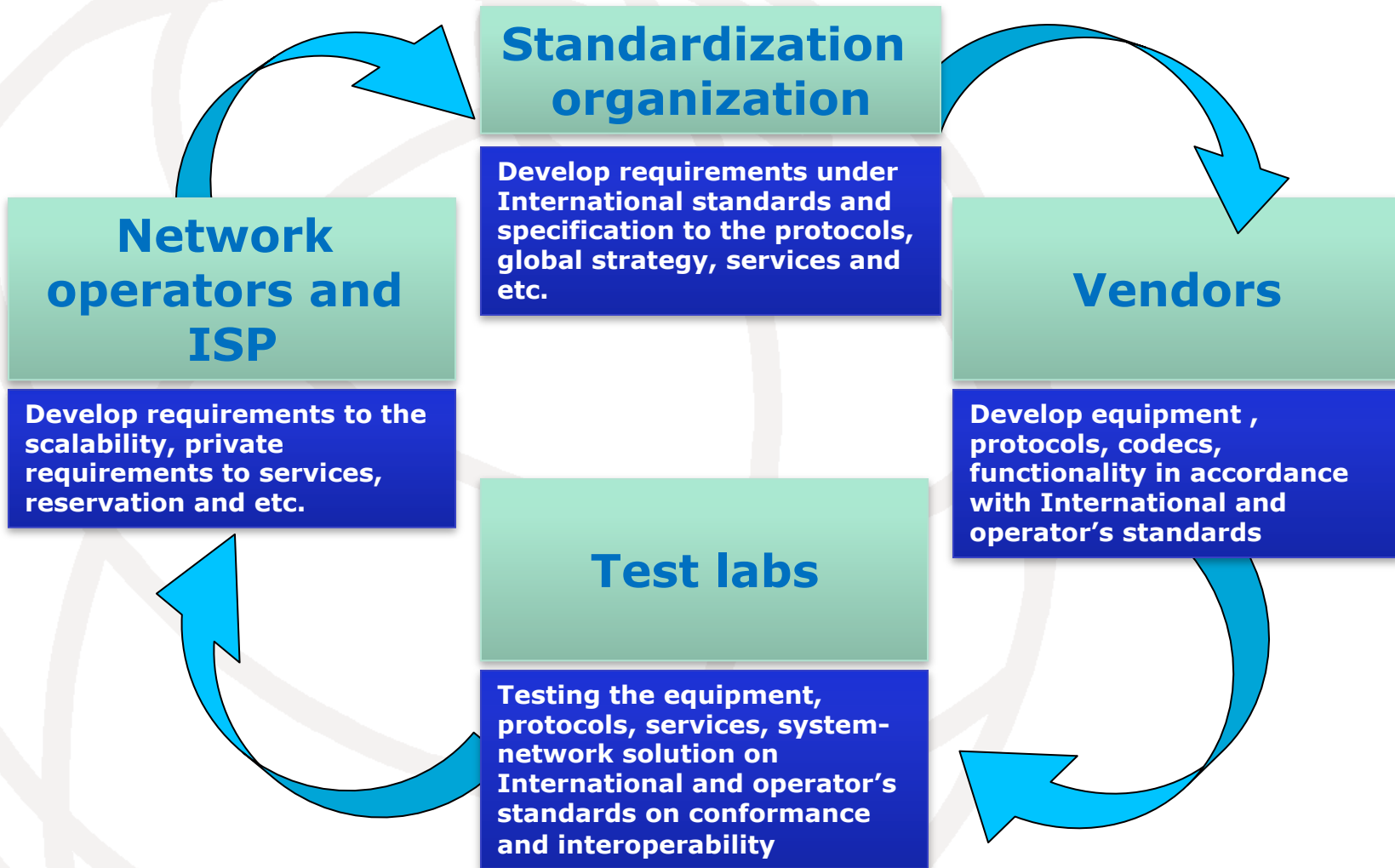
1. The International experience of testing center creation

The common lack of exist assessment compatibility methods and verification services before implementing to networks

- **The process is very costly and investment does not back in full and in short time**

- **The unique of network solution are absent (private strategy and private network solutions)**

- **The private network solutions could not be distribute widely it's covered narrow tasks**

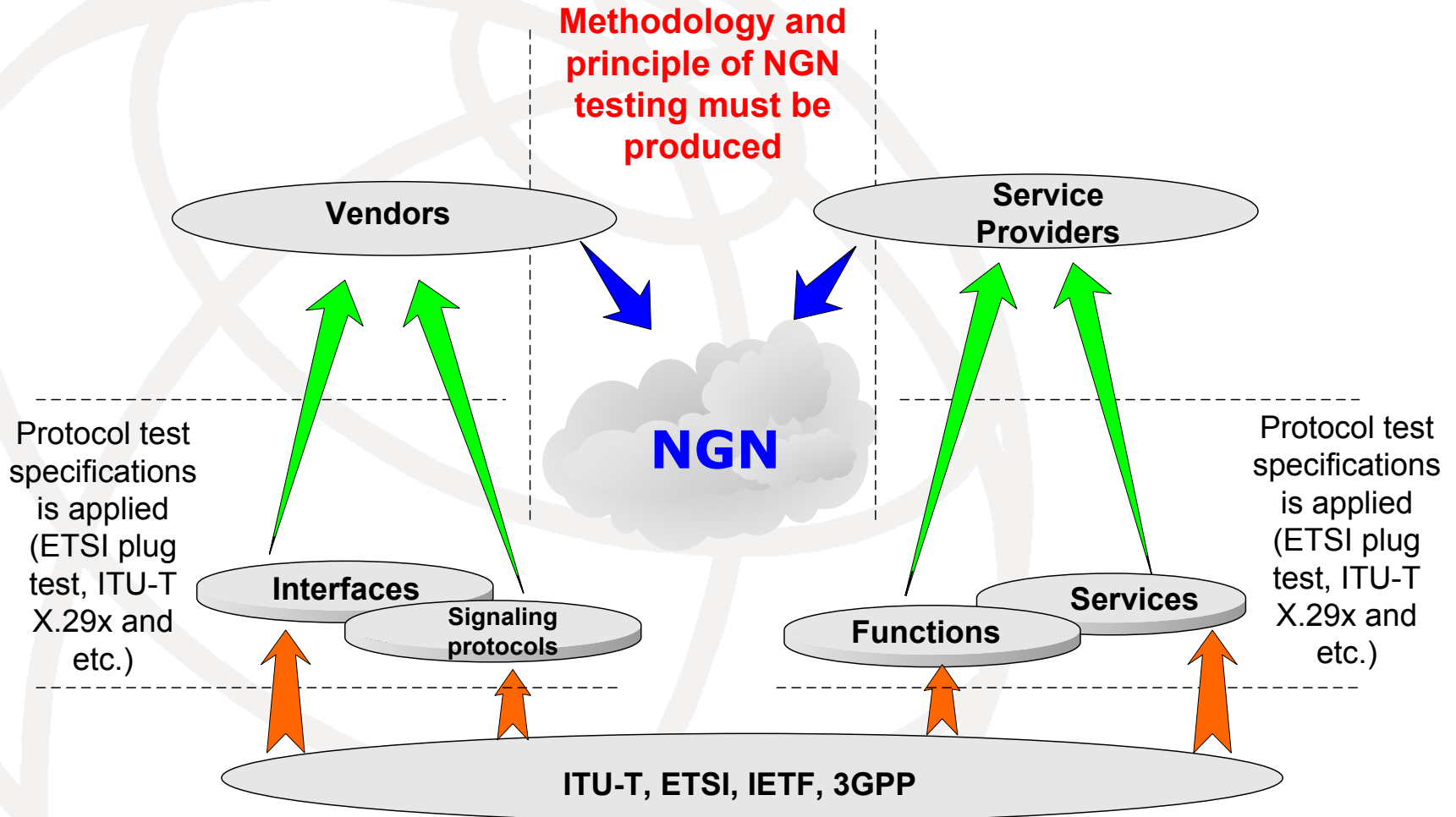# 2. The optimal strategy of standardization and testing organization procedure

The list and tasks of key players of process

Standardization organization

Develop requirements under International standards and specification to the protocols, global strategy, services and etc.

Network operators and ISP

Develop requirements to the scalability, private requirements to services, reservation and etc.

Vendors

Develop equipment , protocols, codecs, functionality in accordance with International and operator's standards

Test labs

Testing the equipment, protocols, services, system-network solution on International and operator's standards on conformance and interoperability

2. The optimal strategy of standardization and testing organization procedure

The organization scheme of interaction of players

Methodology and principle of NGN testing must be produced

Vendors

Service Providers

NGN

Protocol test specifications is applied (ETSI plug test, ITU-T X.29x and etc.)

Protocol test specifications is applied (ETSI plug test, ITU-T X.29x and etc.)

Interfaces

Signaling protocols

Functions

Services

ITU-T, ETSI, IETF, 3GPP

2. The optimal strategy of standardization and testing organization procedure

The typical process of interaction
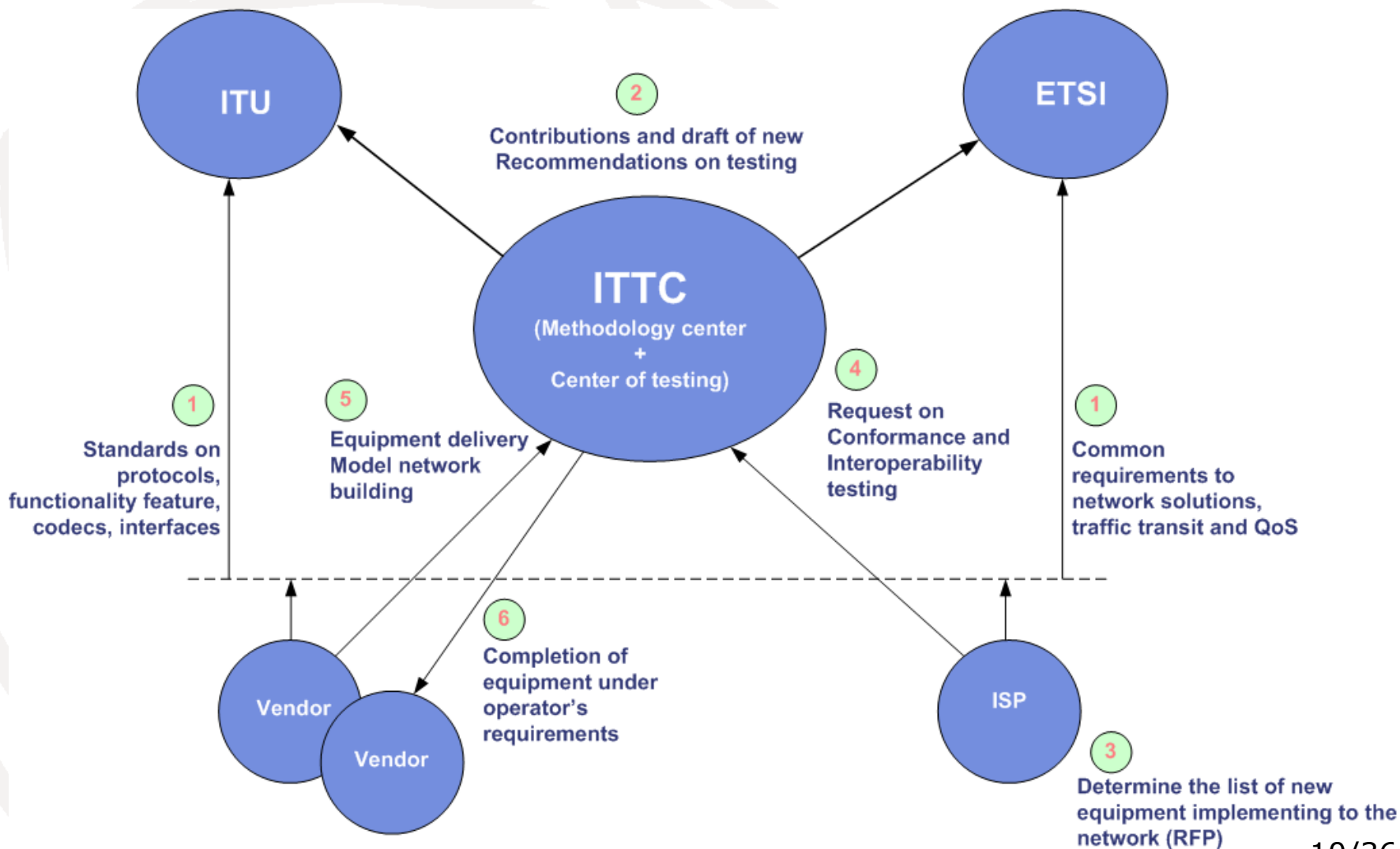
3. The role of International telecommunication testing centers (ITTC)

The actuality

- ✓ **Unified and test network solutions for Region (equipment requirements, special requirements to services and QoS)**

- ✓ **Equipment cost reduce by means of distribute costs on all operators of Region (similarity ETSI Plugtests)**

- ✓ **Possibility of service and not on the regular situation simulation with purpose to determine the optimal operation conditions of equipment, network solutions and their performance**

3. The role of International telecommunication testing centers (ITTC)

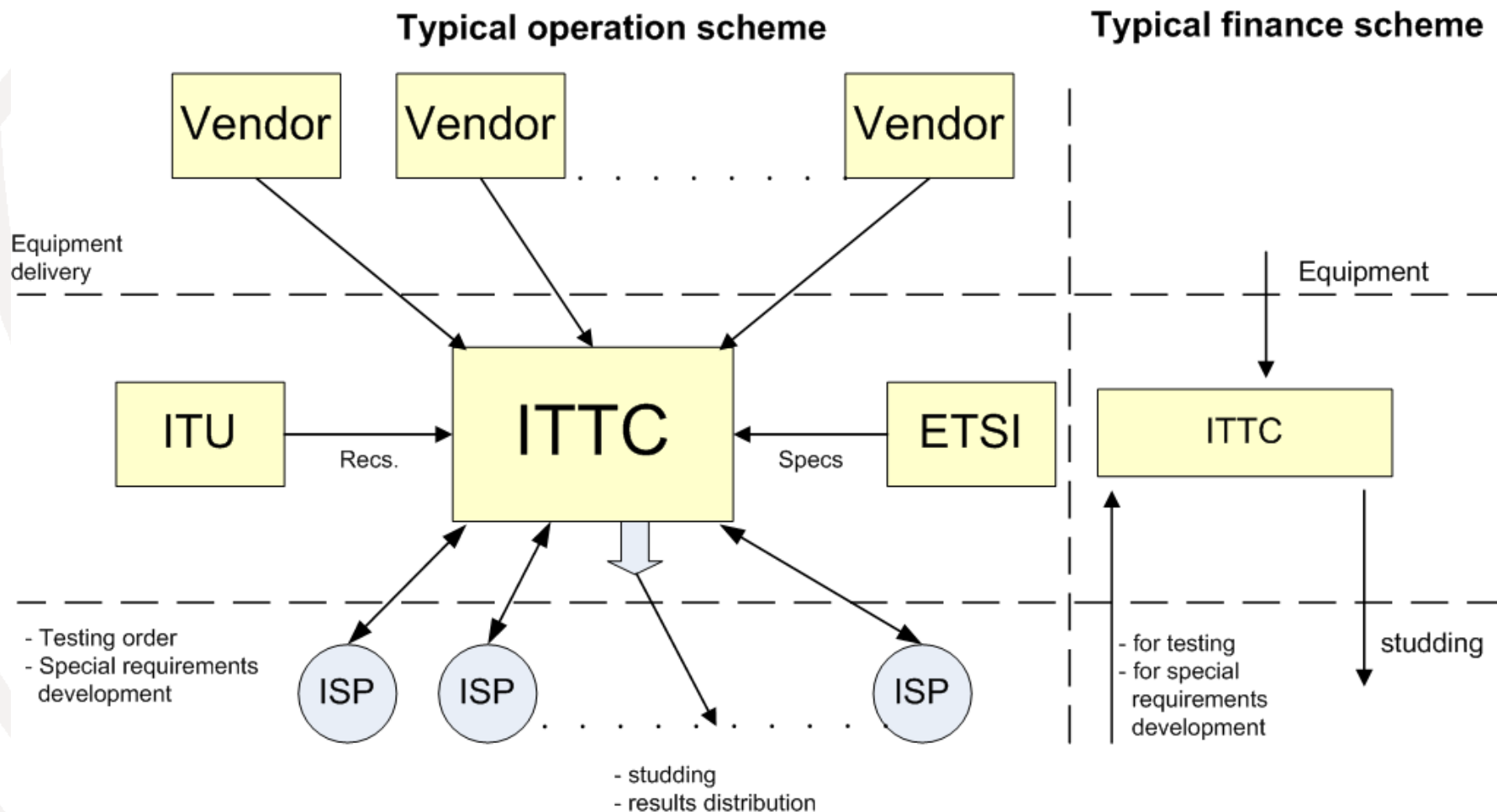**The purpose of Regional center**

Conformance and Interoperability testing on International standards

Testing on: functionality, special requirements of Region's operators and performance

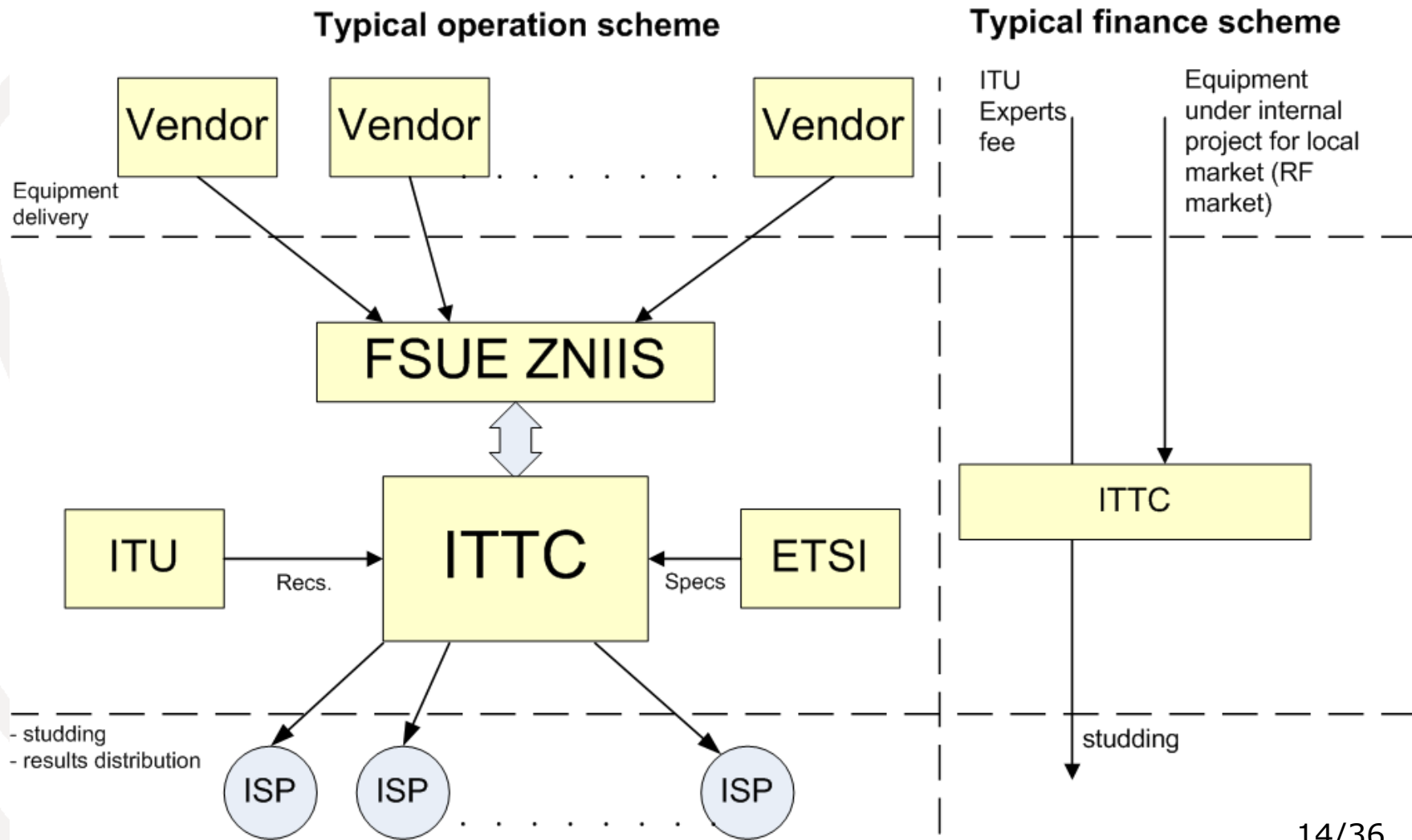**Studying of testing process and implementation**

3. The role of International telecommunication testing centers (ITTC)

Operation and business model of Regional center

3. The role of International telecommunication testing centers (ITTC)

Operation and business model of ITTC Regional center in Moscow

3. The role of International telecommunication testing centers (ITTC)

The common problems of exist Regional center (as a full-fledged Regional center)

- ✓ **Lack of united work program for Region (regional specific requirements, methodics of testing)**

- ✓ **Private tasks and experience of separate ISP**

- ✓ **Lack of result significance for a Region**

- ✓ **Persistence of study process (mandatory presence on study event). Does not study all and everything**

# 3. The role of International telecommunication testing centers (ITTC)

The common role of center results for Region as a whole

- ✓ **Establish business and operational model of Regional center as a central point for testing before implementation on the exist network (mandatory for all Region's ISP) with participation experts of all Region's ISP and finance by key players of market**

- ✓ **Establish ITTC results as a common requirements for implementation equipment, network solutions and services on Region's operators exist networks**

- ✓ **Creation new mechanism of studding by virtual connectivity (Virtual lab). For instance, during WTDC-10 the new project as initiative of RCC was started "Virtual Labs"**

4. Structure of ITTC include testing lab facilities, technologies to be tested, personal to be trained

The structure and typical tasks of center's departments
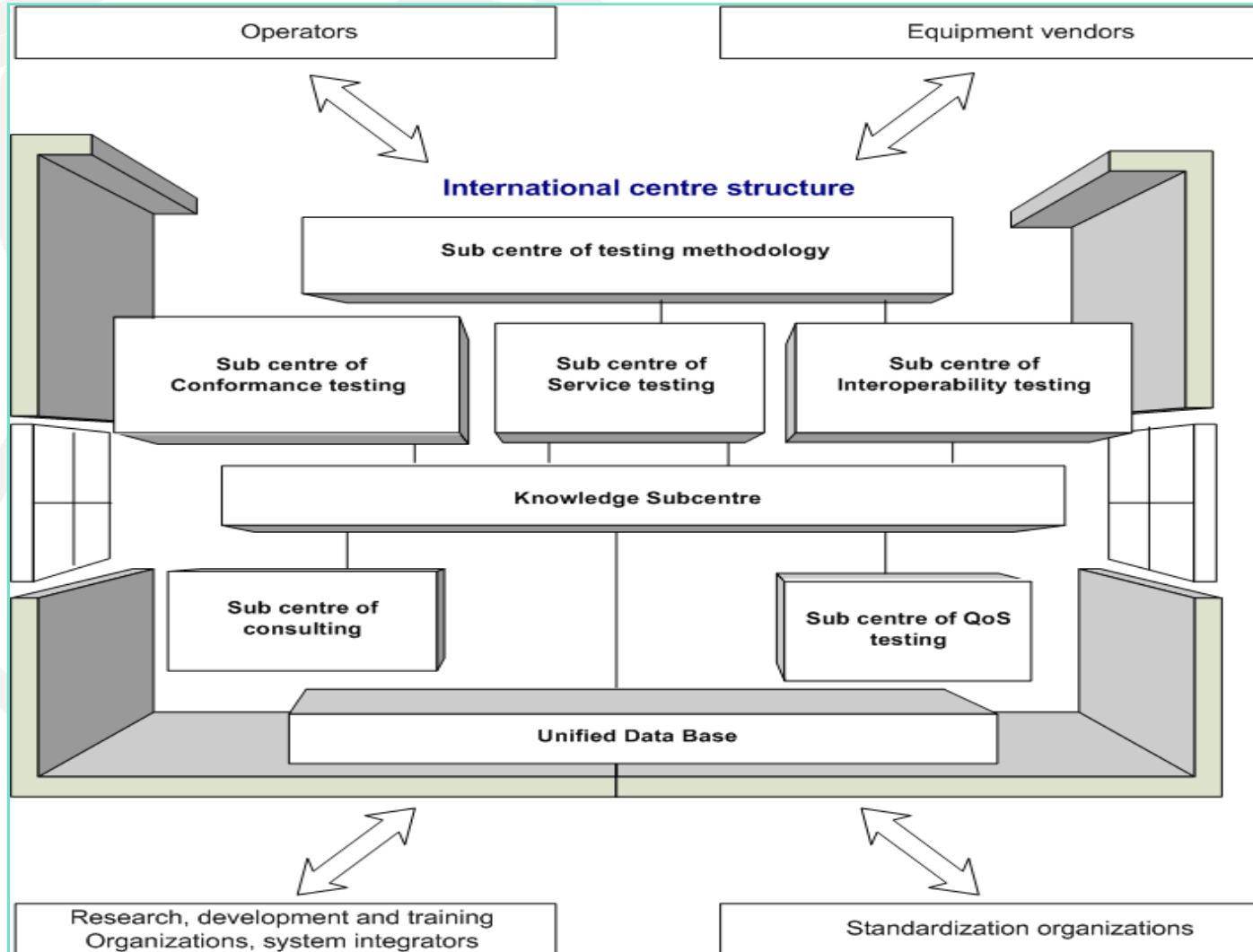
4. Structure of ITTC include testing lab facilities, technologies to be tested, personal to be trained

The technical infrastructure of ITTC 01

- ✓ **Line wire infrastructure with possibility emulation of long distance optical transport line (till 1000 Km) with retransmit area till 400 km, emulation of optical access with distance till 30 km and emulation cooper wire with distance till 15 km**
- ✓ **Optical transport infrastructure under xWDM and SDH technologies include not less than two retransmit area**
- ✓ **Transport packet switch infrastructure based on IP/MPLS technologies with not less than three autonomy systems**
- ✓ **Access infrastructure: MSAN, xPON, xDSL, FTTx, WiFi, WiMax, Ethernet;**
- ✓ **Call control infrastructure with possibility to create not less than 5 typical nodes emulation**
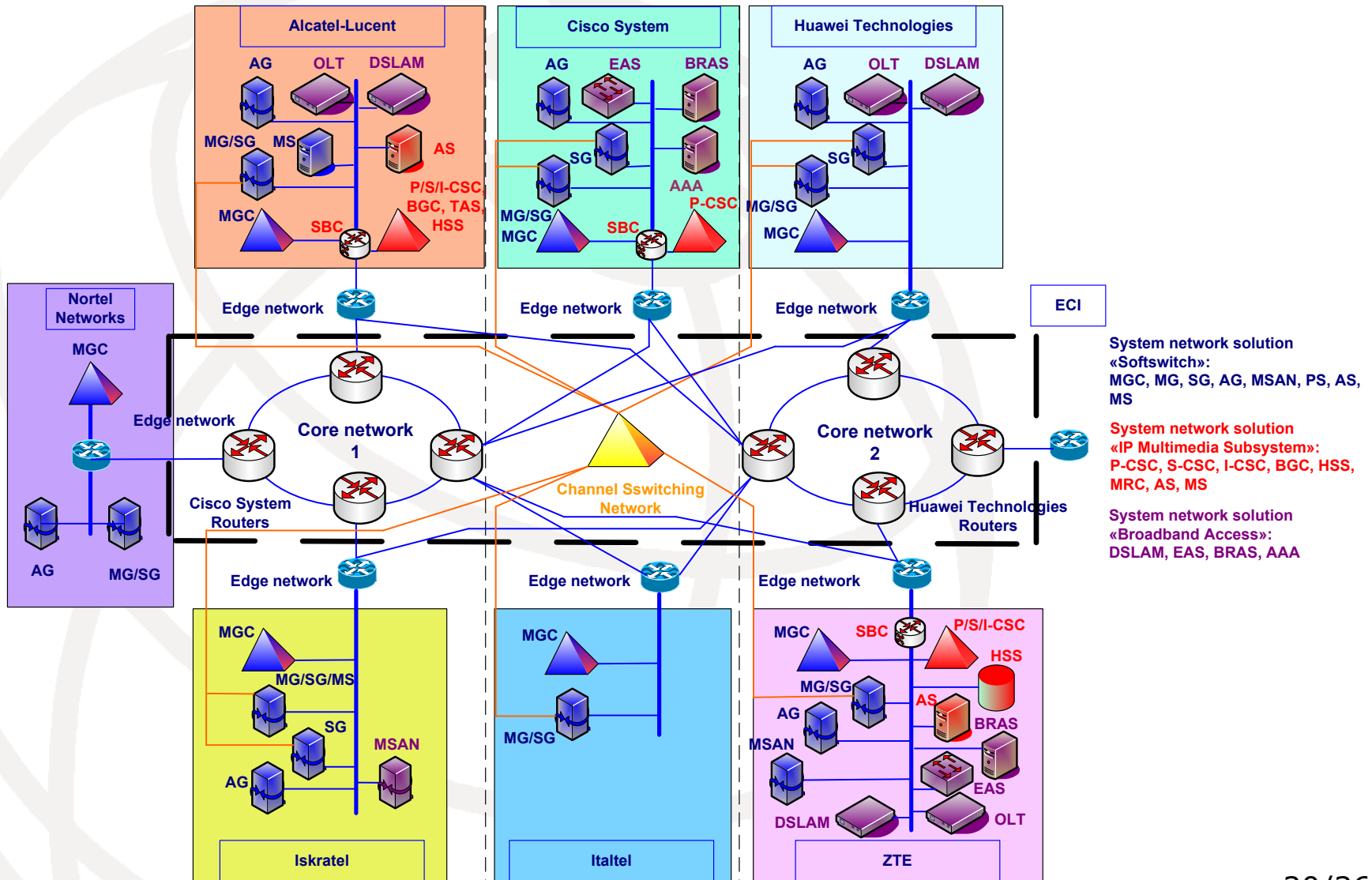
4. Structure of ITTC include testing lab facilities, technologies to be tested, personal to be trained

The technical infrastructure of ITTC 02

- ✓ **Application stratum emulation for providing Supplementary services, TV services and converged services**
- ✓ **OSS/BSS system**
- ✓ **Network control stratum emulation**
- ✓ **Terminal equipment include wire and wireless Terminal equipment**
- ✓ **Infrastructure remote access include special mobile work place**
- ✓ **Database infrastructure with possibility of storage, analyze and preview**
- ✓ **LAN of Model network for operation process**

The instance of technical infrastructure of ITTC (ITTC of Moscow)

System network solution «Softswitch»: MGC, MG, SG, AG, MSAN, PS, AS, MS

System network solution «IP Multimedia Subsystem»: P-CSC, S-CSC, I-CSC, BGC, HSS, MRC, AS, MS

System network solution «Broadband Access»: DSLAM, EAS, BRAS, AAA

4. Structure of ITTC include testing lab facilities, technologies to be tested, personal to be trained

The common set of tests on the Model networks

- ✓ **Testing on conformance and interoperability on international specification**
- ✓ **Testing on special parameters of network operators**
- ✓ **Testing equipment, network solutions under payload**
- ✓ **Testing new services**
- ✓ **Testing the systems (equipment, network solutions) under emulate incorrect messages**
- ✓ **Testing protocols and interfaces**
- ✓ **Testing control stratum process**
- ✓ **QoS testing**
- ✓ **Metrology testing**

4. Structure of ITTC include testing lab facilities, technologies to be tested, personal to be trained

The possibility of unified DataBase

- Support of all documents on equipment and software which is testing on the Model network include storage of etalon software

- Registration results of testing and all additional documents (daily reports, history of detected errors correction and etc.)

- Support of equipment, services and technology testing Regestry

- Storage and analyze results of testing (filter, content searcher and etc.)

- Electronic portal for preview testing procedure

- Remote access to the DataBase

4. Structure of ITTC include testing lab facilities, technologies to be tested, personal to be trained

The set of measurement equipment

- **The automatic test system based on TTCN-3 scripts and realized test specifications (ATS) for conformance testing**

- **The generator of invariant payload (public telephone network, public packet network and services)**

- **The network architecture emulation system (virtual equipment) for emulation packet switching traffic transit**

- **The QoS and monitoring/control test system include possibility different class of traffic generation**

- **The system of transfer incorrect messages and parameters**

The scheme of testing procedure on the ITTC infrastructure
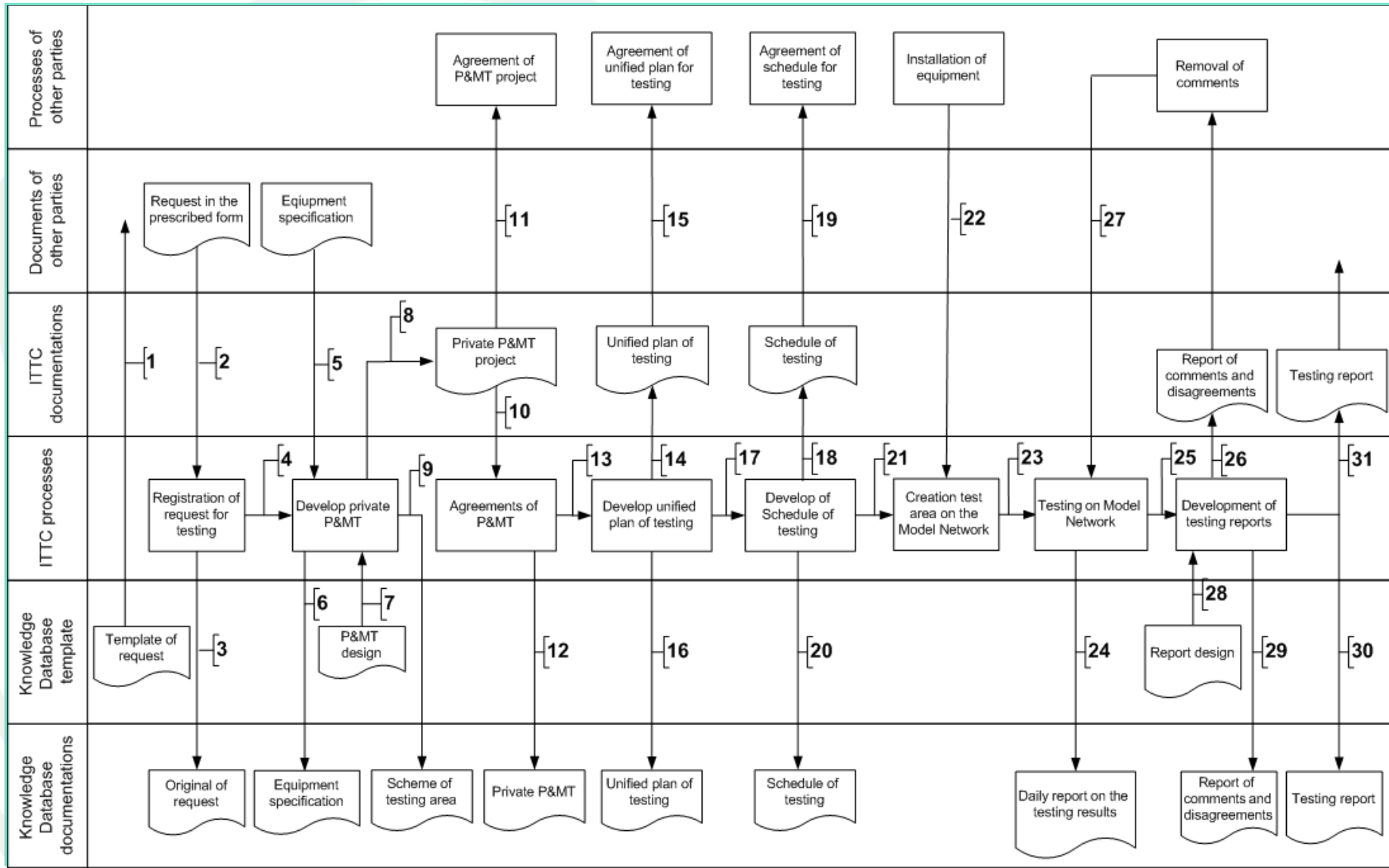
6. The typical work plan for building ITTC

- **Conception of creating ITTC** taking into account Region specific development (tasks, requirements for test zone, "live" functionality procedure and etc.)

- **Work project of ITTC building** development (testing scheme, set of telecom equipment, set of measurement equipment, requirements to the premises)

- **Normative-technical documentation development** (testing procedure, training procedure and etc.)

- **Testing scheme creation** (delivery telecom and measurement equipment, preparation cable infrastructure and etc.)

- **Testing program creation for Region** (specific test specification for Region's ISP)

- **Data base and unified Internet portal development**

- **Training courses development** and providing training event

7. The ZNIIS experience on testing and facilities on creation ITTC

- **The Model network is developed** (in accordance with Rec. ITU-T Q.3900)

- **More than 100 Vendors/network solutions were tested** for request of national ISP

- **More than 50 test specification** for NGN and traditional networks (TDM) were **developed**

- The ITTC under **joint project ITU-ZNIIS was built** (5 training event were provided, 3 test event was done)

- **The automatic scripts (ATS)** for testing based on TTCN-3 is under construction

- **The Virtual lab** is a new project ITU-ZNIIS for development for next 4 years

Conclusion

- **ITTC has a mandatory strategy significance for Region and ITU as a whole**

- **The creation centre like ITTC will raise quality and speed of implementation equipment and services on the Region's ISP networks**

- **ITTC become unified center for a Region within the framework testing and training**

- **ITTC can to reduce digital gap in the development countries**

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