ITU WORKSHOP ON NGN CONFORMITY AND INTEROPERABILITY TESTING CENTRE (S) FOR THE AFRICA REGION

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Approaches of Testing Labs creation. Purposes, tasks and facilities of Testing Labs

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Contents

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

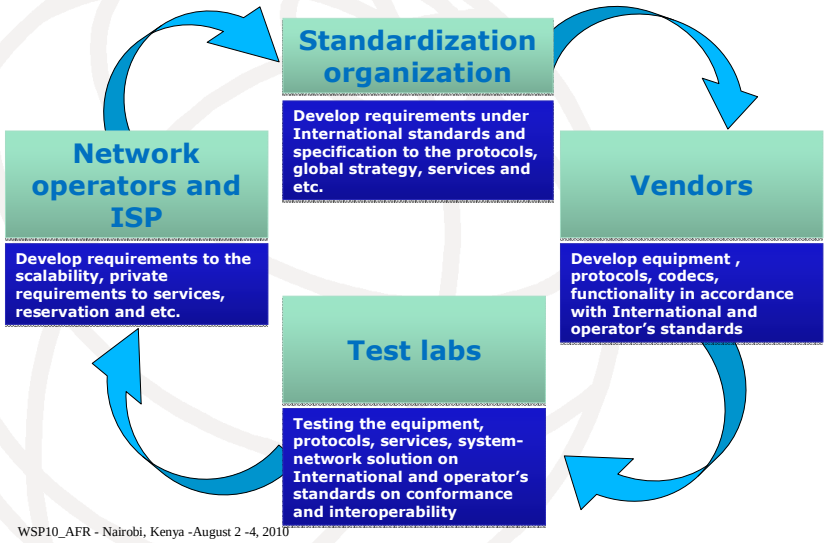
1. The International experience of testing center creation

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

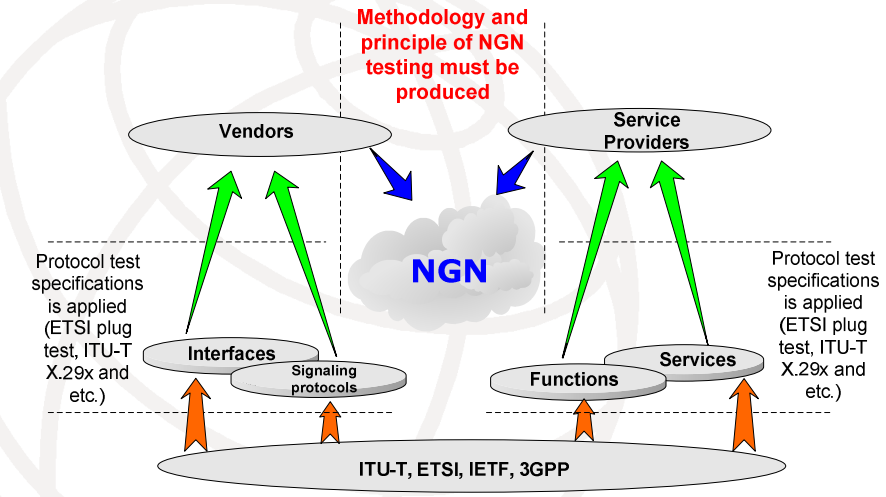
2. The optimal strategy of standardization and testing organization procedure

The list and tasks of key players of process



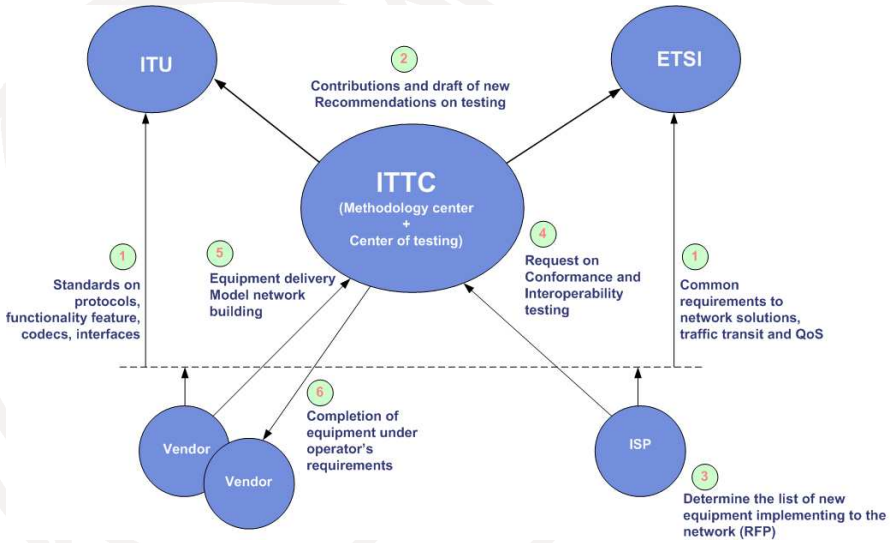
2. The optimal strategy of standardization and testing organization procedure

The organization scheme of interaction of players



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

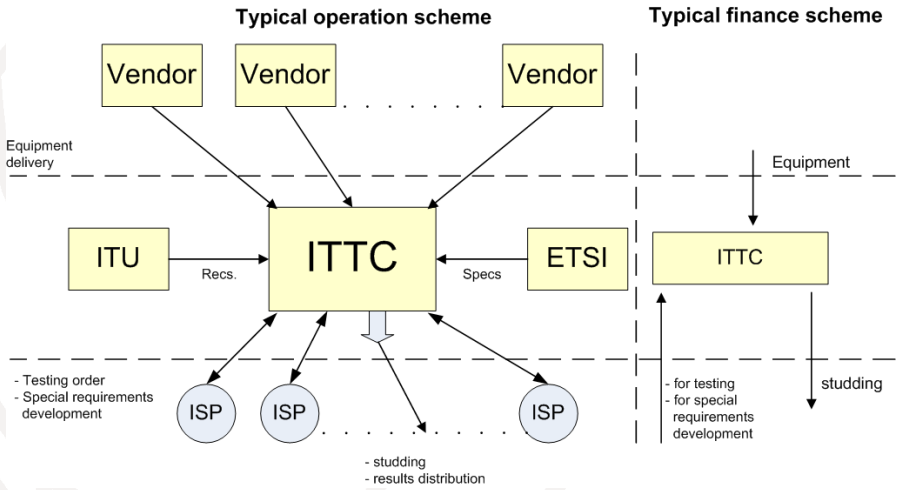
Conformance and Interoperability testing on International standards

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

Studding of testing process and implementation

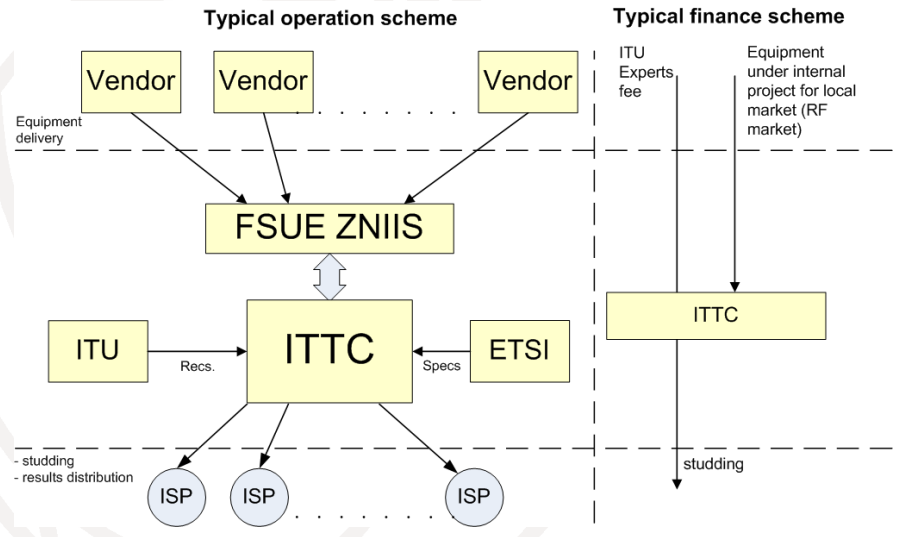
3. The role of International telecommunication testing centers (ITTC)

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 typical tasks of center's departments 01

Sub centre of Conformance testing

- Development of test methods (equipment, system-network solutions and protocols) to compliance on international telecommunication standards in accordance with Region request and further present it as a ITU-T Recs.
- Development of test methods in terms of operators special requirements for given Region
- Realized testing process on model network and on the "live" operator network in the Region
- Forming and support a knowledge base in accordance with group problems and providing all results to the telecommunication community via ITU-T include ITU database

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

The typical tasks of center's departments 02

Sub centre of Service testing

- Development requirements (special parameters for each service: logic, QoS, set of mandatory functional entities, call flow and etc.) for new services which is actual for Region's ISP and further present it as a ITU-T Recs.
- Development of test methods for services to compliance on international telecommunication standards taking into account the special requirements for given Region and further present it as a ITU-T Recs.
- Realized testing process on model network and on the "live" operator network in the Region
- Forming and support a knowledge base in accordance with group problems and providing all results to the telecommunication community via ITU-T include ITU database

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The typical tasks of center's departments 03

Sub centre of Interoperability testing

- Development the requirements for network solutions for the implementation it on the Region market (in accordance with agreed position of a Region's ISP)
- Prepare the methodics of testing (test specs.) for testing on the interoperability taking into account the special requirements for given Region and further present it as ITU-T Recs.
- Realized testing process on model network and on the "live" operator network in the Region
- Forming and support a knowledge base in accordance with group problems and providing all results to the telecommunication community via ITU-T (include ITU database)
- To consult Region's ISP on Interoperability questions:
- Forming and support a knowledge base in accordance with group problems

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

The typical tasks of center's departments 04

Sub centre of Quality of service testing(QoS)

- Development in accordance with technical experience requirements for parameters of QoS for network and services and further present it as ITU-T Recs.
- Development of QoS testing methods and further present it as ITU-T Recs.
- Realized of testing process on model network and on the "live" operator network
- Development typical of service level agreements (SLA), according with Region's ISP network characteristics
- Certification of operator network on quality of service parameters in accordance with developed SLA
- Forming and support a knowledge base in accordance with group problems

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

The typical tasks of center's departments 05

Sub centre of consulting

- Development recommendations with deep description how implement the set of actual services
- Development the special parameters for services for maintain services on the Region's ISP for their compatibility (service roaming)
- Development recommendations on implementation of international organizations standards in terms of regions network development
- Development of recommendations for the introduction of new telecommunication technologies
- Development of recommendations on the compatibility of technical equipment of different manufacturers
- Development recommendations on network building under QoS requirements

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**

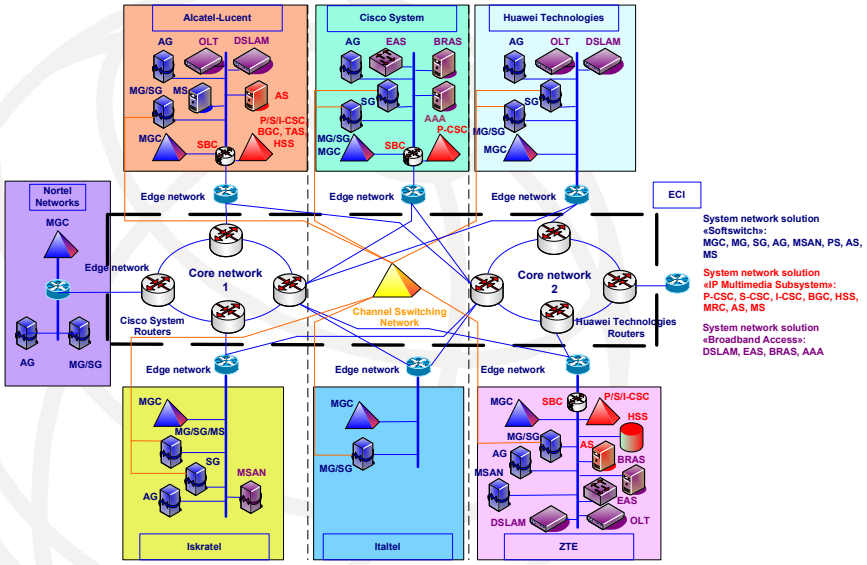
4. Structure of ITTC include testing lab facilities, technologies to be tested, personal to be trained

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**

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

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



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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

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

The training

- **Confront training** (testing approaches, implementation of NGN equipment, principle of compare equipment, implementation QoS parameters on the network and etc.)
- **Virtual training**

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The virtual training

WTDC-10
RCC initiative was supported.

"Creation virtual laboratories for remote equipment, technologies and services testing under Resolution 76 WTDC-08, ITU database filling and providing remote experts of development countries training"

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

The organization scheme of Virtual lab

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

The typical operational process of Virtual Lab

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The typical request to Virtual Lab for initiate testing

Vendor1 (V1)
1. Type of equipment : *MGC*
2. Company producer : *Alcatel-Lucent*
3. Model Equipment : *A5020*
4. Software version : *RUSSX2*
5. Type of inspections: compatibility(interop)

Vendor 2 (V2)
1. Type of equipment : MGC
2. Company producer : Cisco
3. Model Equipment : PGW2200
4. Software version : 9.7 (3), 5.0 (2) V05
5. Type of inspections: compatibility(interop)

Types of inspections
Basic Call
Suplemental service

Possibilities of measuring equipment
1. Changes in the parameters of the initiating side: *YES*
2. Analysis of the signaling message by initiating side: *YES*
3. Analysis of the signaling message terminating side : *YES*
4. Testing under payload : *YES*
   The payload in BHCI: *0.7 Erl.*

Features test zone
1. Ability to customize the butt interface : *YES*
2. Access control system equipment : *YES*
3. Ability to configure routing : *YES*
4. Ability to change the timers : *YES*

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

The typical response from Virtual Lab to the customer with registration information

1. **Request number** — ***SSW_LINIT_UZ_INT_001/10***
2. **Test date** — ***20.06.2011***
3. **Time trials** — ***12:30***
4. **Type the selected solutions** — ***Softswitch***
5. **Equipment V1** — ***Alcatel-Lucent (A5020/RUSSX2)***
6. **Equipment V2** — ***Cisco (PGW2200/9.7(3),5.0(2)V05)***
7. **Detailed request** — ***SSW_LINIT_UZ_INT_001/10.pdf***
8. **Responsibly face from ITTC** — ***Savin K.A.***
9. **Contact** — ***+7 495 368-9111/E-mail:*** savin@zniis.ru

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The typical response from Virtual Lab to the customer with registration information

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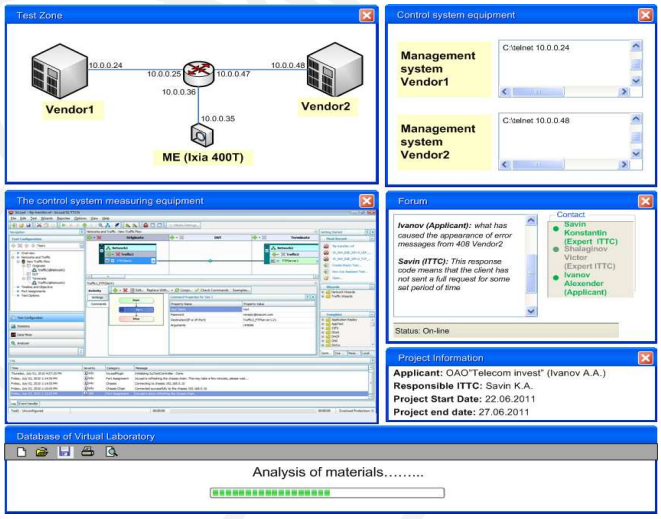
The Portal of Virtual Lab



5. ITTC's operational procedure

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** (4 training event were provided, 2 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

6. 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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Thank you for your attention !!!

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