



ITU Regional Seminar

Belgrade, Serbia and Montenegro, 20-24 June 2005

Session 2.2

ITU-BDT Manual on Network Planning for Evolving Network Architectures

Evolving infrastructures to NGN and related Planning Strategies and Tools – I.S.

Session 2.2- 1

Reference Manual Telecom Network Planning for Evolving Network Architectures

Version 01 – 2003 :

- 210 pages
- 16 references within the text
- 6 additional reference documents (contributions)

Version 02 – 2004 :

- 334 pages total
- 78 references within the text total
- 2 new additional reference documents

Evolving infrastructures to NGN and related Planning Strategies and Tools – I.S.

Session 2.2- 2

NP Manual - Version 01 - 2003

List of registered Contributors to the Reference Manual :

Riccardo Passerini -	Coordinator, Geneva, Switzerland
Ignat Stanev –	Editor, Sofia, Bulgaria
Oscar Soto -	Madrid, Spain
Prof. Michal Pioro -	Warsaw, Poland
Prof. Deep Medhi -	Kansas City, USA
Prof. Villy Iversen -	Copenhagen, Denmark
Jarmo Suihkonen -	Nokia Networks, Business development, Finland
Auwalu K.Abdullahi -	NITEL, Nigeria
Tran Thanh Ha -	Department of International cooperation Ministry of Posts and Telematics, Viet Nam

NP Manual - Version 01 - 2003

List of registered Contributors to the Reference Manual (cont.) :

Attila Vajda -	Dept. For External Relations, Ministry of Informatics and Communications, Hungary
A. Afzali -	Director General of Study Groups Bureau Telecommunication Company of Iran(TCI)
Alireza Tabarzan (Alia Mohseni Behbahani) -	TCI(Telecommunication Compani Of Iran)
Hadi Maleki Parst -	Data Communication of Iran, Iran, Tehran
Saeed Latifi Benmaran -	Expert in telecommunications specially in data communication, TCI (Telecommunication Company of Iran)
Markus Buchner -	VPIsystems
Roland Goetz -	LS telcom AG

NP Manual - Version 01 - 2004

List of registered Contributors to the Reference Manual :

- Riccardo Passerini -** Coordinator, Geneva, Switzerland
Ignat Stanev – Editor, Sofia, Bulgaria
Oscar Soto - Madrid, Spain
Prof. Michal Pioro - Warsaw, Poland
Prof. Slawomir Kuklinski – University of Warsaw, Poland
Prof. Villy Iversen - Copenhagen, Denmark
Ms. Tran Thanh Ha - Department of International cooperation
Ministry of Posts and Telematics, Viet Nam
Mr. Le Ba Tan M.E. - Department of Science and Technology
Ministry of Posts and Telematics, Viet Nam

NP Manual - Version 01 - 2004

List of registered Contributors to the Reference Manual (cont.) :

- Dr. Dinh Van Dzung –** Head of New Services and Automation Department
Research Institute of Posts and Telematics, Viet
Nam
A. Afzali - Director General of Study Groups Bureau,
Telecommunication Company of Iran(TCI)
Vladimir Gardabhaze – Chief of ICT Divison of Telecommunication Strategy
Research Department, Ministry of Infrastructure
and Development, Georgia
Mr. Peter Moka – Supervisor Traffic, Telikom PNG LTD, Papua New
Guinea
Mr. Alabujev Oleg – Head of Planning and Project Department,
Moldetelecom, Moldova

NP Manual - Version 01 - 2004

List of registered Contributors to the Reference Manual (cont.) :

Mr. Kamal Bhagat –	Jt. DDG (NM), BSNL C.O., New Delhi, India
Mr. Patrick Mwesigwa –	Technical Manager, Uganda Communications Commission, Uganda
Mr. Simon Bugada –	Assist. Technical Manager, Uganda Communications Commission, Uganda
Ashot Mamyan -	Head of Telecommunication Network Development Division, Armentel, Republic of Armenia
Nikolay Tikunov –	Senior engineer of the Telecommunication Network Development Division, Armentel, Republic of Armenia
Dirk Seewald -	VPIsystems
Roland Goetz -	LS telcom AG

Who should use the NP Manual

The Reference Manual is intended for use by network planning experts from telecom operators, policy makers and regulators to facilitate the development of their respective strategies for evolution of the present network architectures and transition to the next generation networks - NGN.

The Reference Manual on the Telecom Network Planning for evolving Network Architectures intends to present an objective and technology neutral view of the issues to be addressed in the planning of the transition to NGN.

Content of the NP Manual

This reference Manual comprises 8 chapters and 3 annexes, each of which could be updated periodically, due to the rapid changes in the telecom networks.

Typical reason for revisions in the manual could be:

- introduction of innovative network technologies and corresponding planning methods
- appearance of new or improved planning tools on the market
- the need for better explanations in the presented material

Content of the NP Manual – Chapter 1

Chapter 1 provides the objectives and context of the manual as well as the content of the different chapters and relation to other ITU activities and documents.

Chapter 1 – Introduction :

- *ITU Vision on Network Planning*
- *WTDC-02 PROGRAMME 2: TECHNOLOGIES AND TELECOMMUNICATION*
- NETWORK DEVELOPMENT – Point 1.3*
 - *Who should use this Manual*
 - *Content of the Manual*

Content of the NP Manual – Chapter 2

Chapter 2 will review the aspects that a planner is confronted with when taking decisions on what to do in the network evolution, when to perform the changes, how to perform the corresponding actions and which processes to follow.

Chapter 2 – Overview of network planning

- **Network planning processes**
- **Overall plans per network layer and technology**
- **Solution mapping per scenario**
- **Relation among technical, business and operational plans**
- **Planning issues and trends when reaching NGN**

Content of the NP Manual – Chapter 3

Chapter 3 addresses the needed modelling and characterization of services that is required for the planning activities.

Chapter 3 – Service definition and forecasting

- **Customer segments**
- **Services definition and characterization. Categories**
- **Services mapping to customer segment**
- **Service forecasting per segment**
- **Service bundling**
- **Service security**

Content of the NP Manual - Chapters

Chapter 4 will give generic traffic characterization. Due to the overall modeling of the network for planning purposes, the needed traffic characterization is less detailed than the one needed for detailed system design.

Chapter 4 – Traffic characterization

- **Traffic units for service characterization**
- **Reference periods for dimensioning**
- **Traffic aggregation process**
- **Traffic matrix**
- **Traffic models**

Content of the NP Manual - Chapters

Chapter 5 gives an overview on the economic modeling for planning and different evaluation procedures.

Chapter 5 – Economical modelling and business plans

- **Business planning**
- **Economic modelling for planning**
- **Economical concepts and terms**

Content of the NP Manual - Chapters

Chapter 6 describes different network architectures and special attention is drawn on the next generation network (NGN) and the migration scenarios from the current TDM networks.

Chapter 6 – Network architectures and technologies

- Network architectures
- New network technologies (MPLS, Ethernet, Wi-Fi, etc.)
- NGN solutions and migration steps

Content of the NP Manual – Chapters(cont.)

Chapter 7 presents an overview on the diverse models and methods used in the telecommunication network planning.

Chapter 7 – Network design, dimensioning and optimization

- Core Network
- Access Network
- Basic optimisation methods
- Specific Issues of Radio Network Planning
- Additional design and dimensional problems

Content of the NP Manual – Chapters(cont.)

Chapter 8 lists the main input data needed for network planning. Network planning, especially performed with NP tools, requires collection of numerous data.

Chapter 8 – Data gathering

- **Geographical information for the studied area**
 - **Vector and Raster data**
 - **Background Maps for Display and Visualization**
- **Demand of services and traffic**
- **Existing network and infrastructure**
- **Telecommunication equipment and costs**

Content of the NP Manual – Annexes

Annex 1 presents a portfolio selection of planning tools to support different planning activities. The selection criteria are: capability to model modern technologies, commercial availability and being well proven in the field.

Annex 1 – Network planning tools

- **Application of EXCEL**
- **PLANITU – ITU**
- **STEM**
- **NetWORKS**
- **VPIsystems**
- **Lstelcom**

Content of the NP Manual – Annexes

Annex 2 provides selection of most frequent case studies (i.e.: Network extension, transmission, signaling, migration to NGN, mobile, etc.) in order to illustrate the application process.

Annex 2 – Case Studies

- **Consolidation of national transit network**
- **Broadband access planning for major cities**
- **Voice over IP over WDM**
- **Mobile network coverage**

NP Manual - Version 03 - 2005

Possible activities for Version 03(not started yet) :

- **Enforcing of Version 02 in some topics**
- **Fixed Mobile Convergence (FMC) issues.**
- **Extension of Mobile networks coverage and access planning.**
- **Special issues for rural networks planning.**
- **Complete network planning case study with data from a developing country.**