ITU-BDT Regional Network Planning Workshop

Cairo – Egypt, 16 - 27 July 2006

Session 2.1

ITU-BDT Manual
on Network Planning
for Evolving Network Architectures

Reference Manual : Telecom Network Planning for Evolving Network Architectures

Telecom Network Planning for evolving Network Architectures

Reference Manual

Draft version 1.1

December 2003

ITU, Geneva, 2003

Version 01 – 2003 :
- **210 pages**
- **16 references within the text**
- **6 additional reference documents (contributions)**

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Reference Manual : Telecom Network Planning for Evolving Network Architectures

Version 02 – 2004 :
- ➢ **334 pages total**
- ➢ **78 references within the text total**
- ➢ **2 new additional reference documents**

Telecom Network Planning for evolving Network Architectures

Reference Manual

Draft version 2.1

January 2005

ITU, Geneva, 2005

Reference Manual : Telecom Network Planning for Evolving Network Architectures

Version 03 – 2005 :
- ➢ **381 pages total**
- ➢ **81 references within the text total**
- ➢ **2 new additional reference documents**

Telecom Network Planning for evolving Network Architectures

Reference Manual

Draft version 3.1

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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 - Chapters

Chapter 1 – Introduction

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.

ITU Vision on Network Planning

Who should use this Manual

Content of the Manual

Content of the NP Manual - Chapters

Chapter 2 – Overview of network planning

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.

2.1.   *Evolution of the Telecom context*

2.2.   *Requirements to the planners*

2.3.   *Typical network planning tasks*

2.4.   *Network planning processes*

2.5.   *Overall plans per network layer and technology*

2.6.   *Solution mapping per scenario*

2.7.   *Relation among technical, business and operational plans*

2.8   *Planning issues and trends when reaching NGN*

Content of the NP Manual - Chapters

Chapter 3 – Service definition and forecasting

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

3.1.   *Customer segments*

3.2.   *Services definition and characterization. Categories*

3.3.   *Services mapping to customer segment*

3.4   *Service forecasting per segment*

3.5.   *Service bundling*

3.6.   *Service security*

Content of the NP Manual - Chapters

Chapter 4 – Traffic characterization

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

4.1. Traffic units for service characterization

4.2. Reference periods for dimensioning

4.3. Traffic aggregation process

4.4. Traffic profiles

4.5. Origin/destination of the traffic flows in Local, Metropolitan, Regional National, Continental and Intercontinental networks

4.6. Interest factors, i.e. attraction coefficients between areas or cities

4.7. Traffic evolution

4.8. Traffic models

Content of the NP Manual - Chapters

Chapter 5 – Economical modelling and business plans

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

5.1. Business planning

5.2. Economic modelling for planning

5.3. Economical concepts and terms

5.4. Economic modelling for services

5.5. Cycle life amortization versus modernization

Content of the NP Manual - Chapters

Chapter 6 – Network architectures and technologies

Chapter 6 describes different network architectures - existing telephony network architectures, data network architectures, data invasion of the telecommunication network, the future telecommunication network architectures. Special attention is drown on the next generation network (NGN) and the migration scenarios from the current TDM networks to this goal.

6.1.   *Network architectures*

6.2   *New network technologies*

6.3.   *NGN solutions and migration steps*

6.4.   *Converged Networks*

Content of the NP Manual – Chapters

Chapter 7 – Network design, dimensioning and optimization

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

7.1.   *Core Network*

7.2   *Access Network*

7.3   *Basic optimisation methods*

7.4   *Specific Issues of Radio Network Planning*

7.5.   *Additional design and dimensional problems*

7.6   *Special issues for rural networks*

Content of the NP Manual – Chapters

Chapter 8 – Data gathering

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

8.1.	*Geographical information for the studied area*
8.2.	*Demand of services in relative penetration per customer category*
8.3.	*Demand of traffic, usually expressed as traffic matrices*
8.4.	*Information for the existing network and infrastructure*
8.5.	*Telecommunication equipment characteristics and capabilities*
8.6.	*QOS requirements*
8.7.	*Telecommunication equipment fixed and variable costs*
8.8.	*Economical and Operational data*

Content of the NP Manual – Annexes

Annex 1 – Network planning tools

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.

A1.1.	*Application of EXCEL*
A1.2.	*PLANITU – ITU*
A1.3.	*STEM*
A1.4.	*NetWORKS*
A1.5.	*VPIsystems*
A1.6.	*LStelcom*

Content of the NP Manual – Annexes

Annex 2 – Case Studies

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

A2.1.   Forecasting of services

A2.2.   Consolidation of national transit network

A2.3.   Business planning

A2.4.   Broadband access planning for major cities

A2.6.   Mobile network coverage

A2.7.   Case study from developing country

Content of the NP Manual – Annexes

Annex 3 – References

Annex 3 contains list with references and glossary of the most frequently used terms and abbreviations.

A3.1.   Direct references within the text

A3.2.   Additional references for extension

A3.3.   ABBREVIATIONS/GLOSSARY

NP Manual - Version 04 - 2006

	TASKS	RESPONSIBILITY, SOURCE	TIME FRAME
1.	First Draft structure of the manual V.04 (with detailed chapters)	Coordinator, Editor	15 June 2006
2.	Receiving of feedback and new contributions to the First Draft V.04	All	1 Sept. 2006
3.	Analysis of the feedback and Issuing of Second Draft V.04	Coordinator, Editor	15 Sept. 2006
4.	Receiving of feedback and new contributions to the Second Draft V.04	All	31 Oct. 2006
5.	Issuing of Third Draft V.04	Coordinator, Editor	10 Nov. 2006
6.	Receiving of feedback and new contributions to the Third Draft V.04	All	30 Nov. 2006
7.	Issuing of the Final Draft Version 04	Coordinator, Editor	10 Dec. 2006
8.	Receiving of feedbacks and final comments to the Final Draft of Version 04	All	31 Dec. 2006
9.	Issuing of Final Draft Version 04 of the Reference Manual for Telecom Network Planning for Evolving Network Architectures	Coordinator, Editor	15 Jan. 2006
10.	Publication of the Version 04 of the Manual on the ITU WEB	Coordinator	30 January. 2007

NP Manual - Version 04 - 2006

Enforcing of Version 03 in some topics

• NGN services demand and traffic forecasting, New network technologies

• Converged Networks - Fixed Mobile Convergence, Broadcasting convergence

• Mobile Specific Issues of Radio Network Planning

• Special issues for rural networks planning

• Additional case studies performed on data from developing countries with tools from ITU partners