



ITU Seminar

Warsaw, Poland , 6-10 October 2003

Session 5.6

Features, Inputs and outputs for most frequent tools: VPI

**Live demo:
Broadband access planning
VPlaccessMaker™**

Introduction

- NGN deployment in the metro networks is a continued process
- It is very important, during this transition, not a single customer to find out any differences in Quality of Service (QoS)
- The QoS should not only be same, but even better

Scenario for network development to NGN on the local exchange level

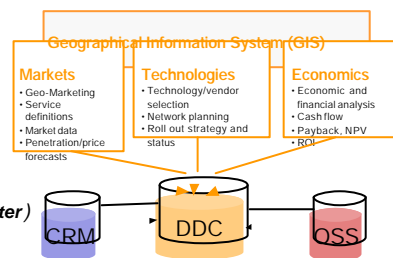
Deployment of equipment compatible to future NGN solutions :

- The scenario includes deployment of Multiservice access nodes and DSLAMs
- During the transition towards NGN this equipment smoothly integrates to NGN by means of centralized or decentralized access gateways (AGW).
- This is a conservative scenario, referred to NGN introduction, but it allows maximum utilization of the existing copper cables and it is comparatively easy for realization.

Business Planning Module VPI Answer

The VPI **Business Planning** software module addresses efficiently and seamlessly the various problem domains and the complex issues involved in planning broadband access networks through a powerful workflow of strategic planning tasks, including:

- ✓ Sophisticated market capture, prediction and reporting systems (**VPlaccessMaker Markets**)
- ✓ Geographical information system (**VPlaccessMaker GIS**)
- ✓ Flexible multi-technology modeling (**VPlaccessMaker Technologies**)
- ✓ Design synthesis algorithms and rollout reporting system (**VPlaccessMaker Technologies**)
- ✓ Effective economic analysis tools (**VPlaccessMaker Economics**)
- ✓ Collaborative working environment (**VPI D&D Center**) for seamlessly connecting people, tools and data



VPIaccessMaker Markets

Market definition

- ✓ Definition of services classes (bandwidth, nature)
- ✓ Creation of customer classes (service mixes, tariffs, lines)
- ✓ Definition of densities classes (as mixes of customer classes)
- ✓ Flexible planning period

Evolution forecasting

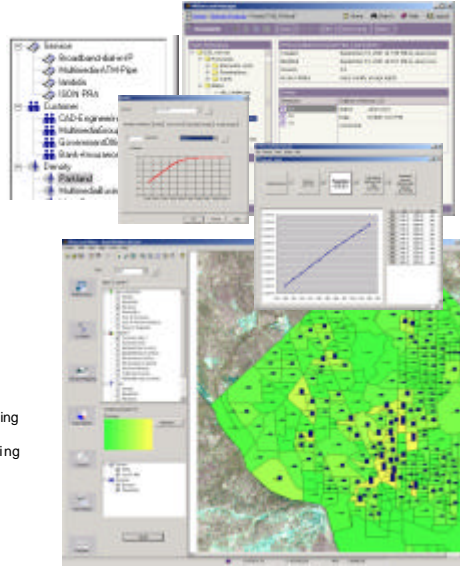
- ✓ Tariffs
- ✓ Market penetration
- ✓ Traffic prediction
- ✓ Component costs
- ✓ Forecast calculator (e.g. times series, linear regression)

Demand mapping

- ✓ Import of raster and vector maps for background information
- ✓ Definition of service areas (sub urban, down town, etc)
- ✓ Geometrical modeling of service areas (area grids)
- ✓ Exact site locations (skyscrapers, business offices, etc.)
- ✓ Defining site grids to simulate BLEC projects and model in-building networks
- ✓ Defining outside plant cost regions for accurate OSP cost modeling
- ✓ Import/export market demand from Excel or from GIS files

Geomarketing results

- ✓ Extensive and flexible user defined query system
- ✓ Results are displayed on the GIS (selected year)
- ✓ Results are displayed on annual tables & charts (exportable to Excel)



Market capture for a service provider

VPIaccessMaker Technologies

Technology modeling

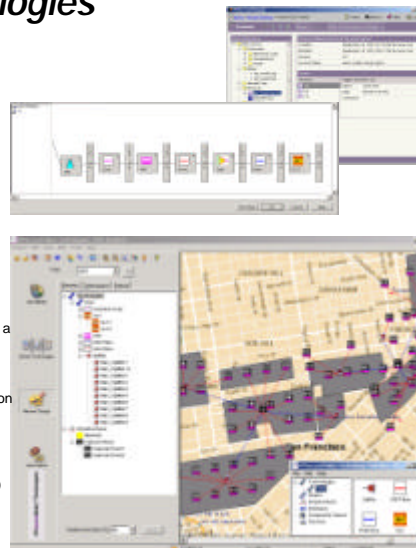
- ✓ Specification of network infrastructure (nodes and links)
- ✓ Specification of network elements (nodes and links)
- ✓ Specification of interfaces (upstream, downstream)
- ✓ Modeling of multiple interfaces
- ✓ Planning rules (bandwidth, distances)
- ✓ Precise cost modeling: acquisition, installation, maintenance, operation, depreciation
- ✓ Chains as connection of nodes and links for topology modeling

Network design optimization

- ✓ Optimization clustering algorithm generates blue-print design proposals
- ✓ Satisfy bandwidth requirement from all demand points
- ✓ Satisfy technological specifications and constraints
- ✓ OSP cost regions for modeling the effects of variations in OSP costs on a regional or local basis
- ✓ Support of multiple technologies
- ✓ Considers legacy infrastructure
- ✓ Manual fine tuning of the network layout for accurate OSP cost estimation

Roll-out results

- ✓ Calculate automatically all network costs
- ✓ Each element (node or link) has its own set of results (interfaces, costs) exportable to Excel
- ✓ Multiple roll-out with different technologies
- ✓ Bill of materials
- ✓ Extensive and flexible user defined query system
- ✓ Results are displayed on the GIS (selected year)
- ✓ Results are displayed on annual tables & charts (exportable to Excel)



Modeling a PON network deployment in a city center

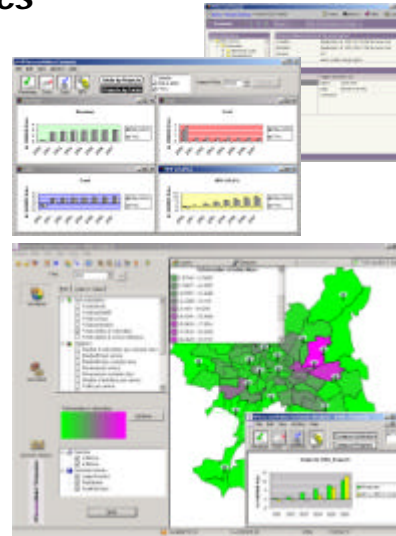
VPlaccessMaker Economics

Financial calculations

- ✓ Project revenues
- ✓ Project cost structure
- ✓ Project cash-flows
- ✓ Project net present value

Scenario analysis

- ✓ Full geographical visualization of the business case
- ✓ Specification of network infrastructure (nodes and links)
- ✓ Various scenarios can be compared in terms of the main economics indexes
- ✓ All data exportable to Excel



Return on investment from a FWA deployment in a metro area

Business Planning Module Benefits

Increased accuracy in planning CapEx and OpEx

- ✓ Accurate market demand capture
- ✓ Demand driven CapEx and OpEx planning
- ✓ Deployment costs are forecasted with greater accuracy
- ✓ Vendor selection is based on real market situations and true product techno-economics
- ✓ Assists in the development of costing metrics (cost per Mbps, cost per customer)

Reduced time-to-market

- ✓ Facilitates decision making on network deployments
- ✓ Facilitates RFQ, RFI preparation and vendor benchmarking: market driven scenarios, common data format (VPI)
- ✓ Better reporting for increased visibility and improved decision making
- ✓ Re-usability of data

Broadband access planning for major Bulgarian cities (Plovdiv and Sofia)

- Planning studies for introduction of xDSL equipment in the cities of Plovdiv and Sofia
- All studies are performed with specialized network planning tool, VPI AccessMaker, which has unique parameters and capabilities

Case study Plovdiv

- Introduction of broadband services to business (SOHO and SME) and limited number of residential customers served by xDSL equipment
- Three categories of services are assumed –
 - ADSL Basic (256/64 kbit/s) for residential and SOHO customers
 - ADSL Gold (512/128 kbit/s) for SME customers
 - SHDSL (512 kbit/s) for SME customers

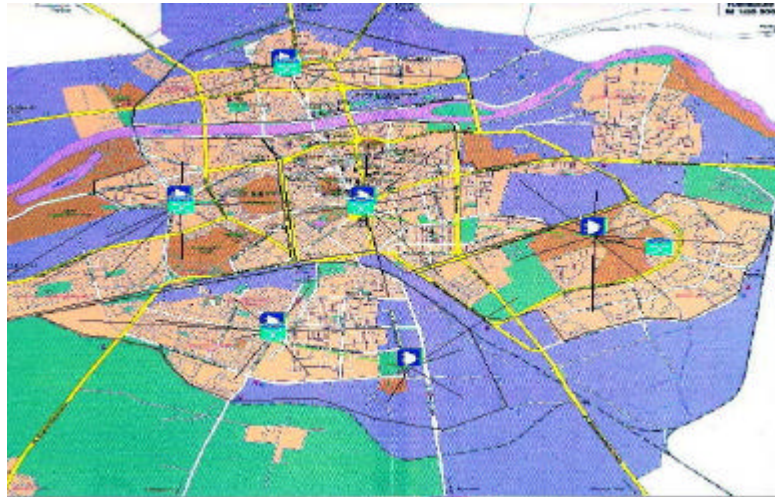
Forecasting results for the possible customers in the period 2003 – 2007

Year	ADSL Basic	ADSL Gold	SHDSL	Total
2003	476	402	132	1010
2004	946	763	159	1868
2005	1416	1122	184	2722
2006	1887	1481	211	3579
2007	2357	1842	238	4437

For the period 2003 – 2007 it is assumed to have:

- 100% growth of SOHO customers,
- 90% growth of SME customers,
- 10% growth of SHDSL customers.
- 20% decrease of the annual installation fees,
- 10% decrease of the annual subscription fees
- 16% discount factor

Optimized DSLAM locations in Plovdiv



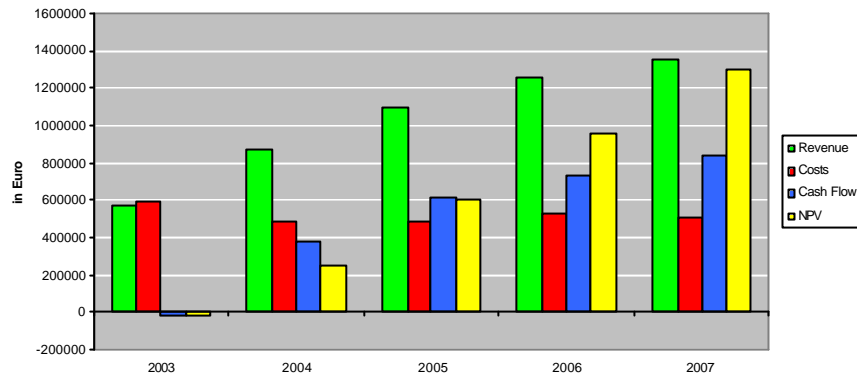
Optimization results - Plovdiv

- Optimization result shows one DSLAM for each existing exchange area, situated in the exchange building
- There is one area, where a second DSLAM will be needed and its location is optimized
- The Planning tool has also produced economic analysis with calculation of costs, revenues, cash flow NPV and IRR

Economic analysis of xDSL in the access network of Plovdiv

Plovdiv_NIIS_dsl

Revenue; Costs; Cash Flow; Net Present Value (IRR=1691.7%)



Preliminary study for Broadband access introduction in the city of Sofia

Services to be offered:

- ADSL-Basic (for residential and SOHO customers),
- ADSL-Gold for SME customers,
- SHDSL for business users
- FE for Large Enterprises.

Forecasted services for the period 2003 - 2007 in Sofia

Services to be offered:

ADSL-Basic

(residential)

ADSL-Gold

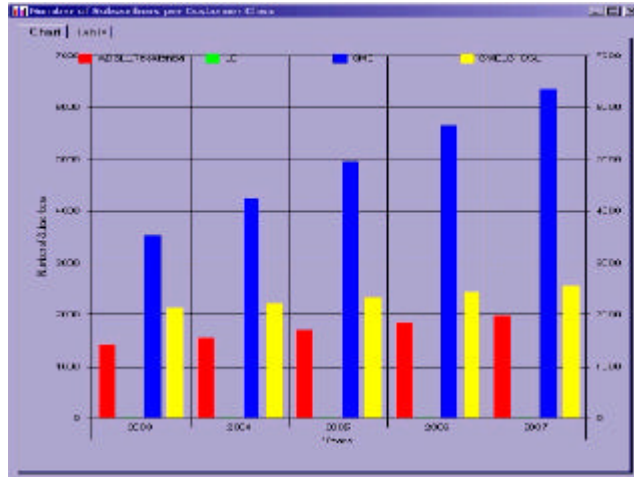
SME

SHDSL -

business users

FE - Large

Enterprises

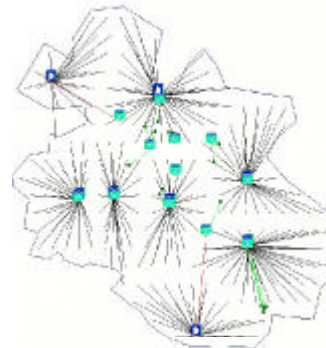


Broadband Services Network Modelling - Network Design



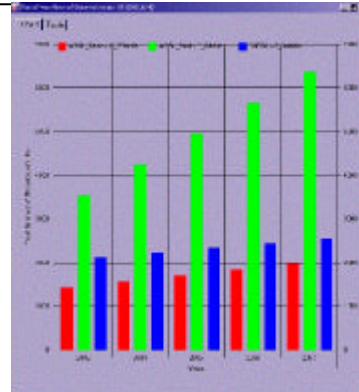
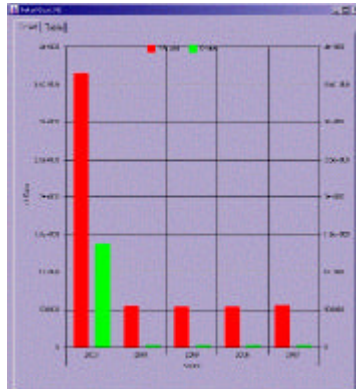
DSLAMs - 8, Routers - 12

Technologies - DSLAMs,
DSL, Routers, FE, GE



Broadband Services Network Modelling - View Rollout

Annual Costs - DSLAM

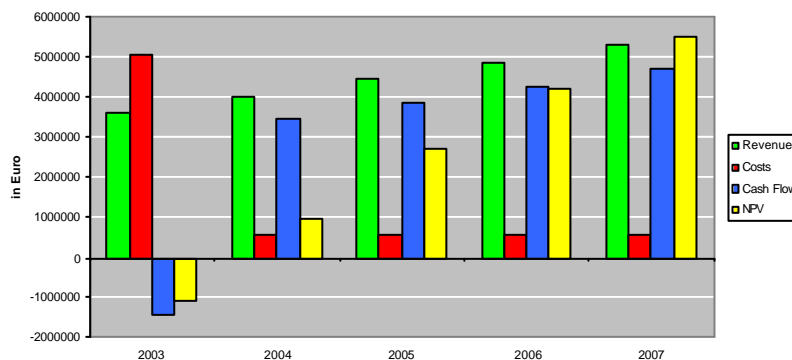


Number of interfaces per year

Broadband Services Network Modelling - Economic Analysis

Sofia_NIS_EX

Revenue; Costs; Cash Flow; Net Present Value (IRR=251.6%)



Conclusions

- Introduction of NGN technologies in the access network could be performed with different scenarios, depending upon the local conditions and market goals of the telecom operator
- Evolution from the current TDM to the future NGN is a long process, which requires careful planning and precise analysis of the different possible strategies for NGN solutions in the access network
- Advanced planning tools will be required to perform all necessary studies and in this way to avoid wrong decisions