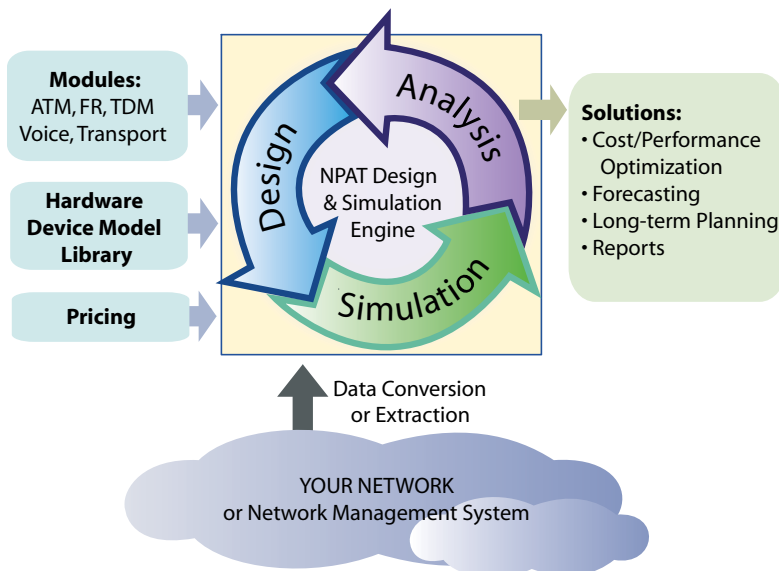


NPAT Network Planning & Analysis Tools

From the early days of the deregulation of the telecommunications industry, the founders of WANDL, Inc. foresaw the need for commercially available network design tools. As the number of carriers grew and as competition increased, it became clear that the expertise to create high quality, professional design solutions for network planning activities could not be housed in each individual carrier operation. Today, WANDL is the leading supplier of software solutions for network design, optimization and capacity planning. Its flagship product, the Network Planning and Analysis Tools (NPAT) system, offers a complete solution for all stages of network design and analysis. The NPAT system encapsulates decades of research and practical experience from dealing with hundreds of real-world networks. It supports ATM, Frame Relay, TDM, Voice and Optical transmission services, and includes accurate models for numerous hardware device types.

NPAT is the complete solution for all stages of network design and analysis.



All over the world, major carriers, ISPs, government agencies, financial institutions and enterprises are currently using the NPAT system to improve network performance and robustness, forecast demands, plan for future growth, and achieve substantial savings on network costs and resources.

NPAT Value Propositions

Improved Network Performance

NPAT considers diversity issues in the design and simulation process so that your network will survive node or private line failures, or any combination of outages. It also detects potential network bottlenecks, minimizes traffic flow delays and so on.

Reduced Network Costs

Implementing effective designs can result in lower hardware and maintenance costs, both in the initial deployment of the network and in subsequent upgrades. Minimizing monthly transmission line costs results in further reductions. NPAT has proven itself repeatedly by creating lower cost designs as compared to those aided by other tools.

Increased Productivity

With the state-of-the-art NPAT design engine and heuristics, tasks such as accommodating traffic growth and optimizing the backbone topology are now practically automated.

Demand Forecasting

NPAT equips planners with accurate information regarding network capacity. Questions such as “How much traffic can be carried by the network?” or “What effect will traffic growth have on the current network?” can be answered with a few keystrokes.



NPAT BACKBONE DESIGN

The NPAT Backbone Design Module offers cross-vendor support for all stages of network design and analysis. Features include:

- **Hardware-Specific Device Libraries**

– Simulate and design with accuracy. WANDL’s close cooperation with device vendors ensures modeling accuracy and precision, as well as the support of many device-specific features.

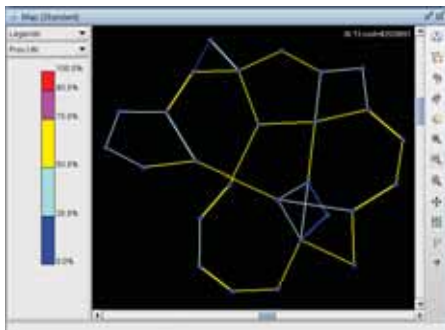
- **“Greenfield” or Incremental Design**

– Design a network from scratch or design on top of an existing network configuration.

- **Resiliency Design** – Design for resiliency or “diversity” against any failure scenario. Ensure capacity is available to reroute traffic in the event of failure.



*Advanced NPAT Design Engine,
incorporating pricing and
resiliency requirements*



Low-cost, robust NPAT Design

Technologies Supported:

ATM, PNNI, Frame Relay, TDM, Voice, SONET/SDH

Hardware Device Models Supported:

Alcatel, Cisco, Lucent, Marconi, net.com, Nortel and Generic devices

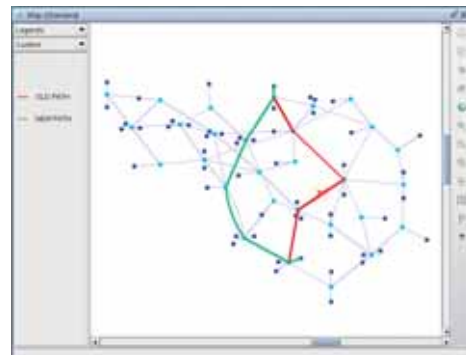
- **Failure Simulation and Analysis** – Study the impact of extensive node, link and facility failure scenarios. Analyze how traffic is rerouted and the effect on network links (e.g. worst-case trunk utilization).

- **Bottleneck Analysis** – Determine traffic routes and bottlenecks for many “What if” scenarios. Identify which trunks will become congested under various failure conditions.

- **Capacity Planning** – Make recommendations on future network expansion based on forecasted requirements by studying the impact of adding new demands before they are placed on the real network. Determine whether there is sufficient available capacity, and if not, where more should be added. Determine which trunks can be pruned without compromising diversity constraints.

- **Network Grooming** – Identify inefficient routing that may result over time from the dynamic rerouting of flows/demands due to network failures. For these demands, generate optimal placement paths using existing network bandwidth.

- **Customizable Tariff Databases** – Reduce network cost. User-customizable pricing tables are incorporated in NPAT heuristics and algorithms to ensure least cost topology designs.

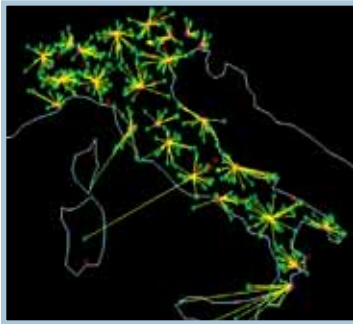


*Interactive Failure Simulation -
Original path (red), New path (green)*

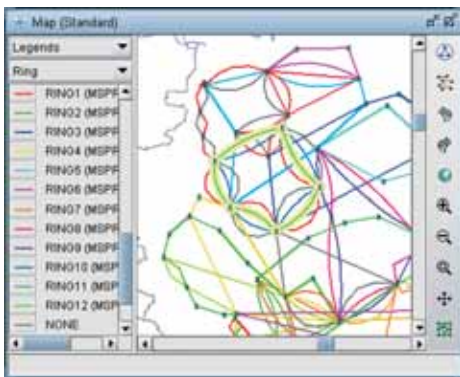
NPAT ACCESS DESIGN

The NPAT Access Design Module finds the correct balance among homing, hardware and backbone costs. It considers the use of dedicated private lines, channel banks and other services. Once the access portion of the network is completed, files can be generated to perform a backbone design. Features include:

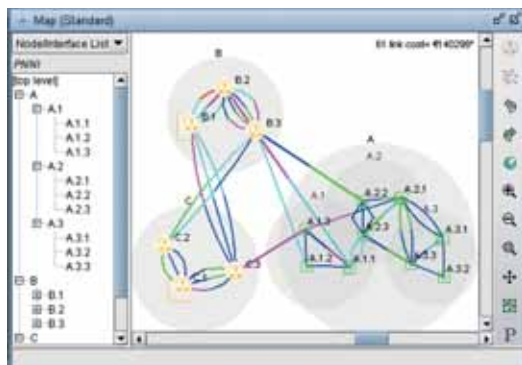
- **Optimal Access Design** – Determine the most cost-effective method of connectivity between remote customer sites and the backbone.
- **Second-level Concentration** – Further reduce network cost using two-level concentrations. This can be performed through the use of M24 channel banks and/or other services.



Intelligent Access Design



Transport Model - Rings



Hierarchical PNNI

ADDITIONAL NPAT FEATURES

- **PNNI and Domain/Structured Network Model** – Partitioned or structured networks, including PNNI's multi-level hierarchical peer groups, are modeled according to device-specific details.
- **Voice Model** – The voice model examines call records and models the interaction between the Voice Switching layer and Transmission layer. The Erlang-B formula and Equivalent Random Method are used to calculate blocking and handle the peakedness of overflow traffic.
- **Transport Model** – The transport model assists in the planning and analysis of SONET, SDH and Optical Wave-Division Multiplexing networks. Ring, mesh and ring/mesh architectures are modeled, as well as GFP/VCAT/LCAS, 1+1 diverse paths and multi-layered networks.
- **Traffic Load Analysis** – Multi-period traffic load per PVC or flow can be loaded into the NPAT system to calculate delay, packet loss ratio and jitter. It can also be used to obtain more accurate link utilization statistics for failure simulations.
- **Data Extraction and Data Conversion** – WANDL can extract or convert data from your network into files ready for use by NPAT. Major hardware vendor devices are supported. Customizable solutions are available upon request.
- **Graphics-Driven Presentation of Network Plans** – Delta comparisons of the network topology or of routing; Web-browsable Java-enabled graphical interface option.
- **State-of-the-art Network Graphics** – Site aggregation with Implode/Explode view; Node location via geographic coordinates, NPA/NXX, or intelligent Automatic Distribution and layout; Connection and path displays across map topology.
- **Extensive Report Generation** – Detailed and useful reports can be generated in text, CSV or HTML formats. Network graphics can be exported into Microsoft Visio or saved in all standard graphical formats.

The NPAT Advantage

At the core of NPAT is an intelligent library of design and simulation algorithms that have been proven on the industries' largest and most challenging networks.

Accuracy

WANDL's close working relationships with hardware device vendors ensure accurate modeling of device-specific details. NPAT's library includes all major routing protocols.

Relevancy

WANDL works with each carrier to incorporate the carrier's design policies into the NPAT system. NPAT includes numerous options to control the parameters of the design. Incremental design can be performed on top of actual network configurations to ensure useful results.

Speed

Driven by powerful heuristic algorithms, NPAT produces superior results in a fraction of the time required by competitors, even on large, complex networks.

Visualization

NPAT makes extensive use of the latest techniques in graphical display for network data. Navigating the complexity of the network is made simple through a well thought out graphical interface.

WANDL, Inc. (Wide Area Network Design Laboratory) is the industry leader in network planning and optimization solutions. Through its software suite, WANDL has been instrumental in helping business and government organizations worldwide in their quest for network operational efficiency and cost savings. The firm's solid expertise and reputation has been established over the last sixteen years in providing software solutions to address network infrastructure optimization. Today, WANDL continues to work closely with leading hardware vendors, Internet Service Providers and carriers worldwide to ensure accurate software solutions that meet the industry's most current needs.

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Recommended System Configuration

Server

- Sun workstation
- Solaris 8 or 9
- 512 MB RAM or more
- 1 GB server disk space*
- CD-ROM

Client (Sun workstation)

- Solaris 8 or 9
- 256 MB RAM
- 100 MB disk space
- CD-ROM

Client (PC)

- Windows 2000/NT/XP
or Linux (supporting Sun VM)
- 256 MB RAM or more
- CD-ROM

**Disk utilization dependent upon network size.*



"OPTIMIZING NETWORK INFRASTRUCTURE"

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