



ITU / BDT- COE workshop

Nairobi, Kenya,

7 – 11 October 2002

Network Planning

Lecture NP- 5.3

Supporting Network Planning Tools

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Lecture NP - 5.3- slide 1



BDT - COE workshop on Network Planning

Module 1: Introduction and Experiences in the Region

Module 2
Role of Network Planning in the current Telecom scenario

Module 3
Integrated Planning Process

Module 4
Specific Network Planning per Layer

Module 5
Supporting Network Planning Tools

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Lecture NP - 5.3- slide 2

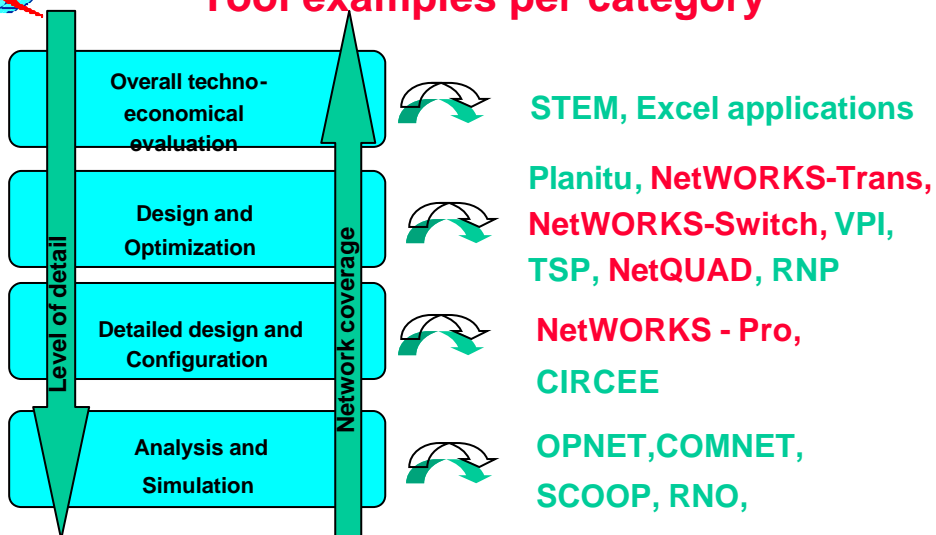


Content Chapter 5.3 Network Planning Tools

- Objectives and classification for the different tool types
 - Overall techno-economical evaluation
 - Network design and optimization
 - Network evaluation and simulation
 - Tool mapping per class



Network Planning Tools: Tool examples per category





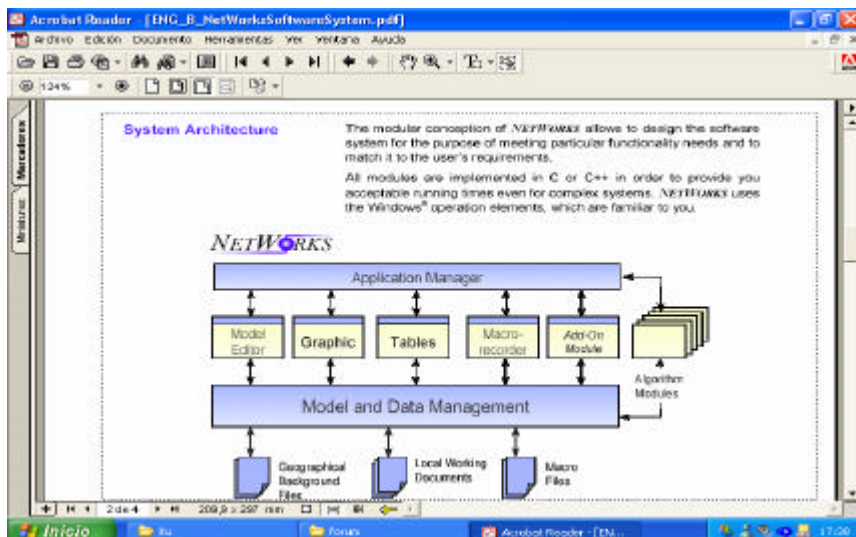
Network Planning Tools: NetWORKS

Objective : NetWORKS is a Telecom network planning tool to design, optimize and dimension several network layers as: Switching, Transmission, Cable, Mobile, etc.

Telecom
Network
Planning

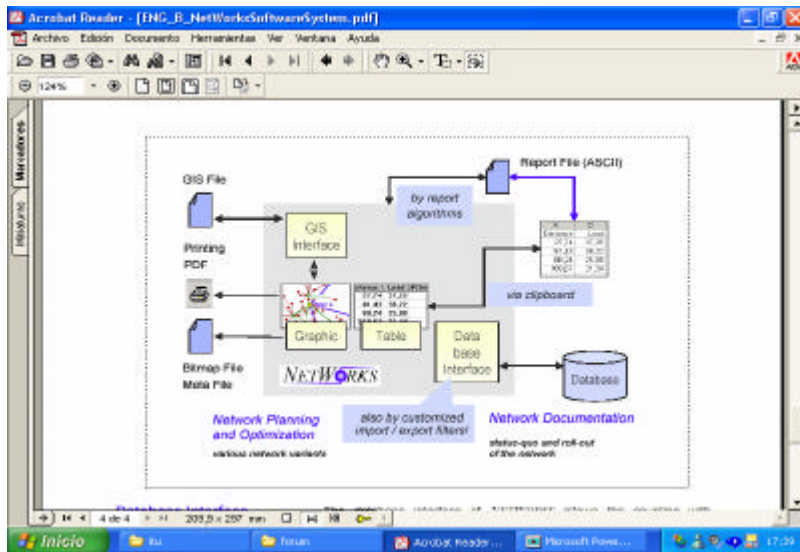


Network Planning Tools: NetWORKS





Network Planning Tools: NetWORKS



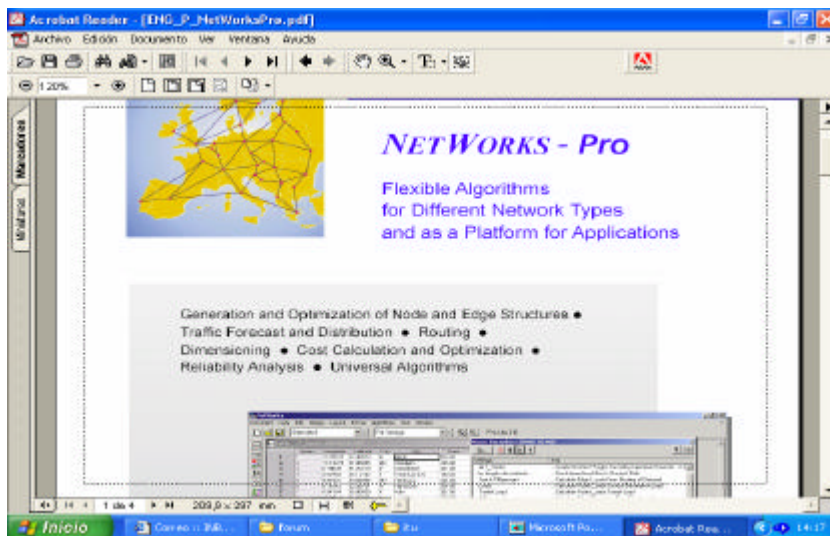
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Network Planning Tools: NetWORKS



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Network Planning Tools: NetWORKS

Flexible Algorithms for Planning and Optimization Various Telecommunications Networks

NetWORKS-Pro is an application for high demands on flexibility in planning and optimization of telecommunications networks regarding:

- various technologies (PDH, SDH, ATM, GSM, circuit and packet switching).
- various network architectures (access networks, backbone networks, variable number of network levels, several network layers).
- various network structures (star, tree, chain, mesh, ring).
- various dimensioning rules (multiplexing, formulas of teletraffic theory, cost-relevant dependencies).
- various routing approaches (non-hierarchical, quasi-hierarchical, hierarchical; with gateways, with hubs).
- various cost functions (linear, partly linear, variable formulas).

Each more or less complex planning step has been consequently implemented as an separate algorithm. So you get the possibility to follow your own planning way according to a special planning task. The tool does not force you to use it in a certain order.

In addition each algorithm has access to all data elements defined in the model (items, parameter, matrices) both as input and output values for an algorithm (see below the example of a routing algorithm).

Methods of Operations Research

The following methods of graph theory, queuing theory and reliability theory as well as integer and heuristic optimization are implemented in algorithms of NetWORKS-Pro:

- Shortest paths in graphs (Dijkstra, Floyd, LC-FIFO with hop number restriction).
- Shortest disjoint paths in graphs (Edwards, Samboini).

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Network Planning Tools: NetWORKS

→ Presentation
→ Edition
→ Calculation
→ Optimization
→ Documentation

NetWORKS-Pro supports you in doing these steps during the planning and optimization process for different highly flexible telecommunications networks. The focus is on:

- various technologies (PDH, SDH, WDM, IP, ATM, GSM, GPRS, UMTS).
- various network architectures (access networks, backbone networks, variable number of network levels, various network layers).
- various network structures (star, tree, chain, mesh, ring).
- various dimensioning rules (multiplexing, formulas of teletraffic theory, cost-relevant dependencies).
- various routing approaches (non-hierarchical, quasi-hierarchical, hierarchical).
- various cost functions (linear, piecewise linear, variable formulas).

NetWORKS-Pro is characterized by:

- completely free modeling, even with physical and logical layers in one model,
- a comprehensive algorithm pool which can be arranged individually,
- user-definable planning cycles which can be matched to the relevant problem,

... editable menus for determining standard planning cycles for recur...

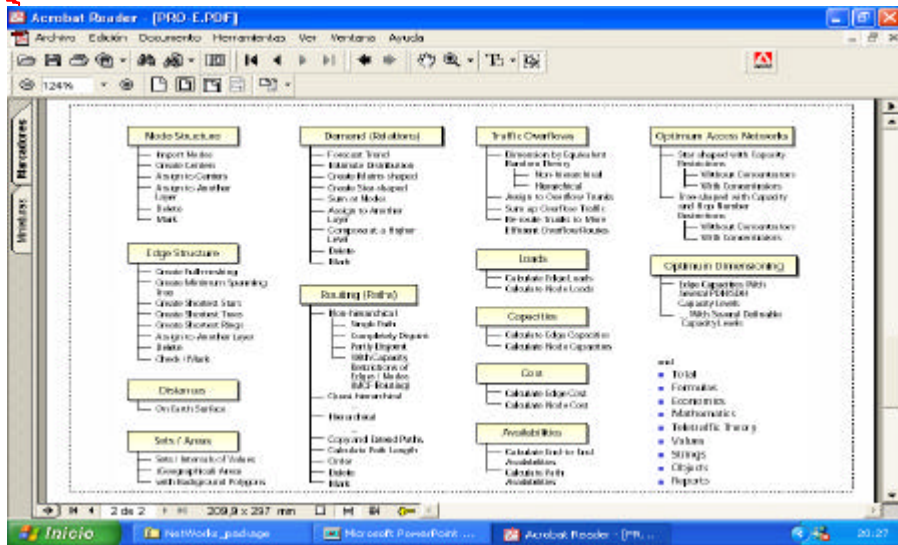
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Network Planning Tools: NetWORKS



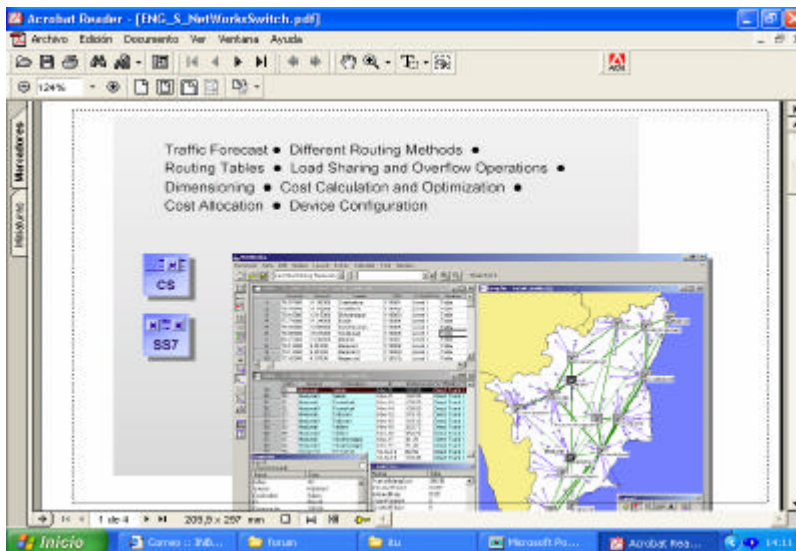
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Network Planning Tools: NetWORKS



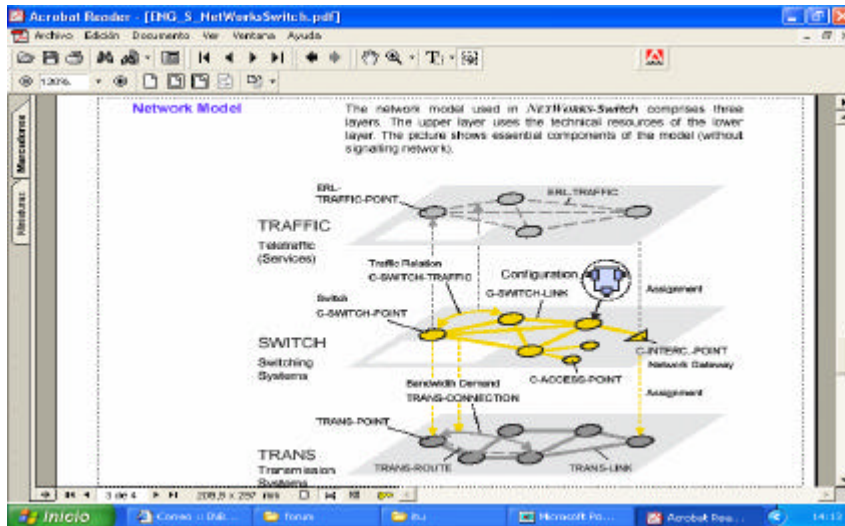
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Network Planning Tools: NetWORKS



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Network Planning Tools: NetWORKS

NetWORKS-Switch supports you in these steps during the planning process for hierarchical and non-hierarchical switching networks. It also allows the planning of signaling networks (SS7). The focus is on:

- Editing of traffic data for planning
- Forecasting of traffic matrices
- Building of transit switches for hierarchical networks
- Calculation of loads and capacities including dimensioning with considering load sharing or traffic overflows
- Calculation of end-to-end blockings
- Optimization of trunks of an overflow structure
- Dimensioning of network gateways
- Estimation of signaling traffic
- Determination of the demand for signaling channels between the signaling nodes
- Detailed allocation of the 64kbps-channels (with payload, signaling traffic, semi-permanent connectors...)
- Configuration of switching nodes with modules and ports
- Estimation of costs
- Generation of routing tables for switches and reports for dimensioning the trunks
- Finding out of the demand for transmission channels for the underlying transmission network

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Network Planning Tools: NetWORKS

Acrobat Reader - [SWITCH-E.PDF]

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NETWORKS

The network model used in *NetFlowSwitch* comprises three layers. An upper layer uses the technical resources of a lower layer.

- **TRAFFIC** - layer that contains traffic sources and traffic relations.

Direct Trunk
-> all together form a full-meshing

Overflow Assignment

Alternative Overflow Route (n = 2 Hops)

The SWITCH layer differs between non-hierarchical and hierarchical networks. In non-hierarchical networks all exchanges are of equal status, the direct trunks form (almost) a full-meshing, the overflow routes are not more than 2 hops long. In hierarchical networks two network levels are created. The traffic overflow is implemented in the order Direct trunk -> Second trunk -> final trunk / Mesh trunk.

Direct Trunk
-> if there is enough direct traffic

Second Trunk

Overflow Assignment

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Inicio | Networks_package | Microsoft PowerPoint... | Acrobat Reader - [S...]

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Application Trans

NETWORKS

Planning and Optimization of SDH and PDH Transmission Networks

NetFlowTrans is an application for specialists who are mainly confronted with PDH and SDH transport networks and who have to deal with complex problems regarding

- Optimization of partly meshed and ring-like network structures.
- Consideration of a given infrastructure (fiber-optic cables, ducts).
- Routing of end-to-end connections by various criteria, with protection if required.
- Calculation of loads and capacities needed for protection facilities.
- Dimensioning of rings.

- **Design** - considering sites and links, demand (end-to-end relations), its paths over sites and links, and the loads and capacities of sites and links (both cable points / links and duct points / links can be considered optionally)
- **Configuration** - considering devices, fibers/microwave channels, transmission systems at different mapping levels and splitted demand (end-to-end connections) and its path over devices and fibers / microwave channels

Network Model

The network model used in *NetFlowTrans* comprises three layers. An upper layer uses the technical resources of a lower layer.

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Network Planning Tools: NetWORKS

Application Trans

Planning and Optimization of SDH and PDH Transmission Networks

NETWORKS

NetWorks-Trans is an application for specialists who are mainly confronted with PDH and SDH transport networks and who have to deal with complex problems regarding:

- Optimization of partly meshed and ring-like network structures.
- Consideration of a given infrastructure (fiber-optic cables, ducts).
- Routing of end-to-end connections, by various criteria, with protection if required.
- Calculation of loads and capacities needed for protection facilities.
- Dimensioning of rings.

■ Design - considering sites and links, demand (end-to-end relations), its paths over sites and links, and the loads and capacities of sites and links (both cable points / links and duct points / links can be considered optionally).

■ Configuration - considering devices, fibers/micro-wave channels, transmission systems at different mapping levels and splitted demand (end-to-end connections) and its path over devices and fibers / microwave channels.

Network Model

The network model used in NetWorks-Trans comprises three layers. An upper layer uses the technical resources of a lower layer.

- TRANS - layer that contains devices, fibers,

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Network Planning Tools: NetWORKS

→ **Presentation**

→ **Edition**

→ **Calculation**

→ **Optimization**

→ **Documentation**

NETWORKS-Trans supports you in these steps during the planning process for PDH, SDH and WDM transport networks. The focus is on:

- Comparison of different network structures (e.g. partly-meshed and ring-like network structures)
- Consideration of a given infrastructure (e.g. fiber-optic cables, microwave systems, ducts)
- Routing of end-to-end connections by various criteria over disjoint paths
- Possible protective strategies
- Calculation of loads and capacities including dimensioning of rings
- Detailed allocation and grouping of containers
- Configuration of devices (multiplexers, cross-connectors etc.) in the network nodes
- Estimation of costs
- Analysis of utilization of network capacities and finding out the bottlenecks
- Generating reports on routing, dimensioning, configuration and demand for devices and modules
- Calculation of end-to-end availabilities

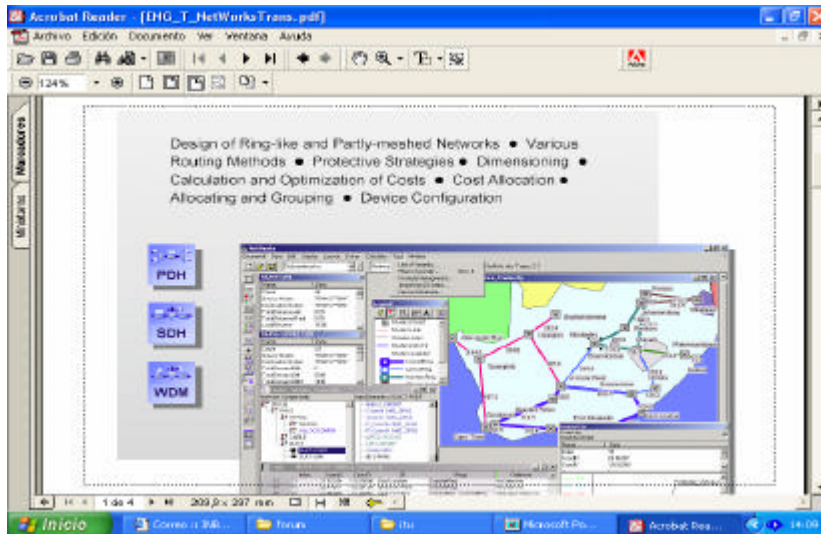
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Network Planning Tools: NetWORKS



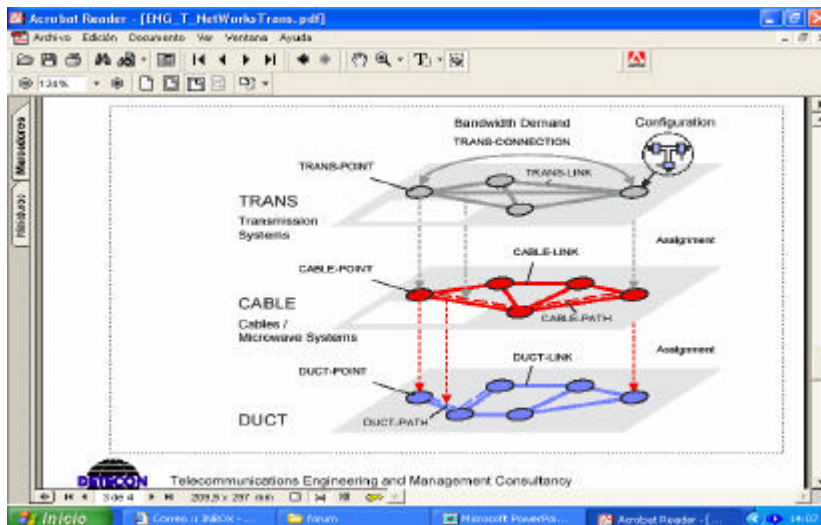
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Network Planning Tools: NetWORKS



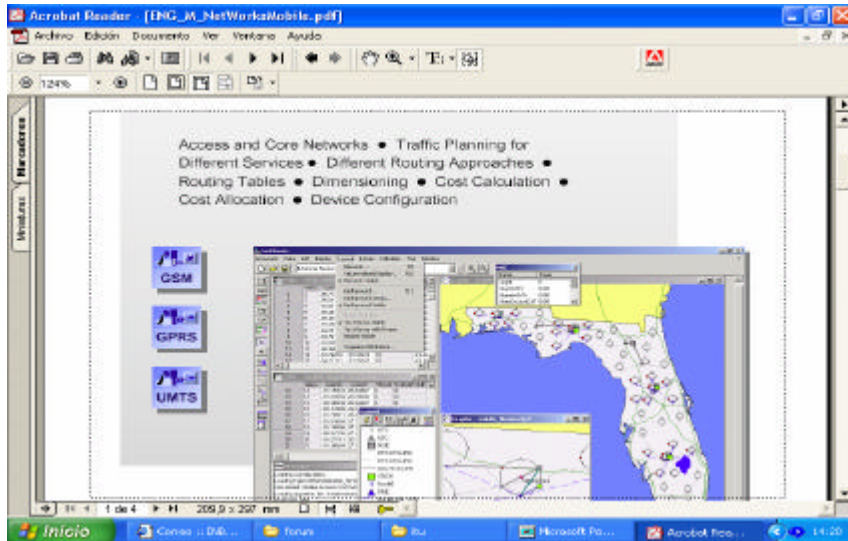
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Network Planning Tools: NetWORKS



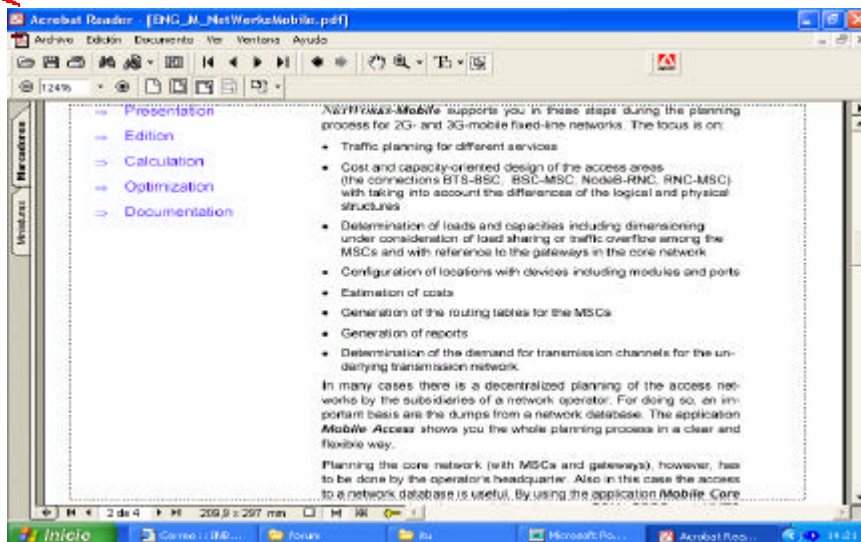
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Network Planning Tools: NetWORKS



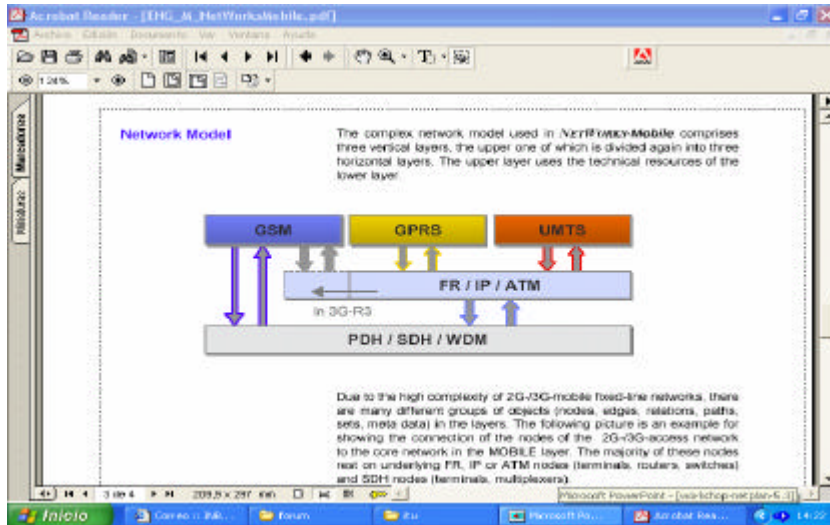
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Network Planning Tools: NetWORKS



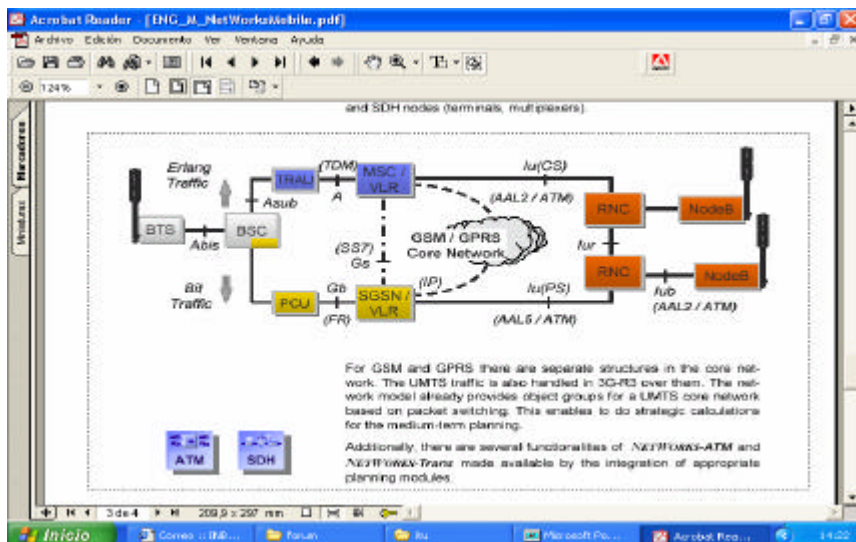
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Network Planning Tools: NetWORKS



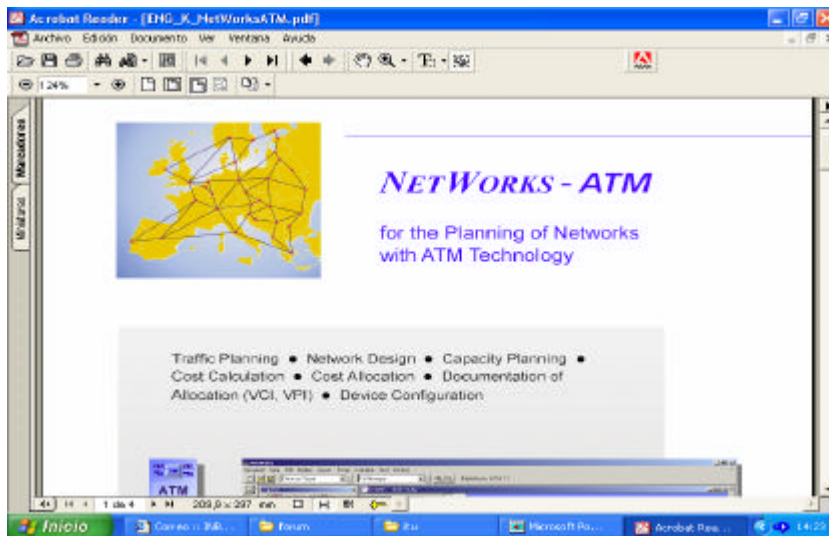
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Network Planning Tools: NetWORKS



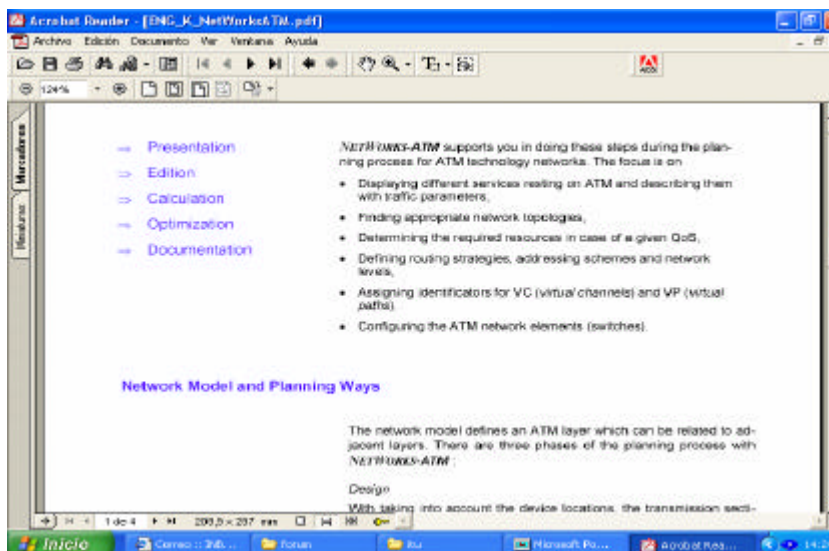
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Network Planning Tools: NetWORKS



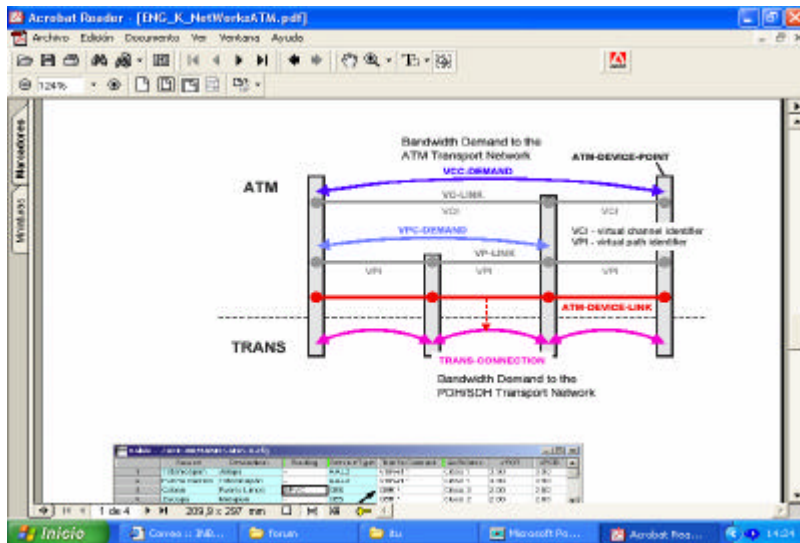
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Network Planning Tools: NetWORKS



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Network Planning Tools: NetWORKS

Algorithms and other Application Functions

Many application functions of NetWORKS-ATM are algorithms which you can setup to and run on your given model. This enables you to follow your individual planning line according to your specific planning task.

NetWORKS-ATM also extends the graphical and tabular functions considerably. Some typical application functions are:

- Planning of ATM traffic contracts (see dialog example)
- Definition of the routing in specific routing dialogs for each individual VCC or VPC
- Tracing the allocation of the physical containers and displaying their utilization
- PNMI configuration
- Device catalog and configuration view for the nodes
- Customized import and export filters for the coupling with databases.

Display of utilization of a physical link (ATM-DEVICE-LINK) by VCC and VPC

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Network Planning Tools: NetQuad

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Objective : NetQuad is a Telecom network planning tool to design, optimize and dimension several network layers as: PSTN, Transmission, ATM, IP

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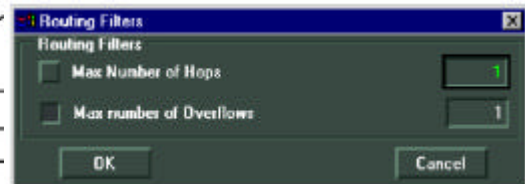
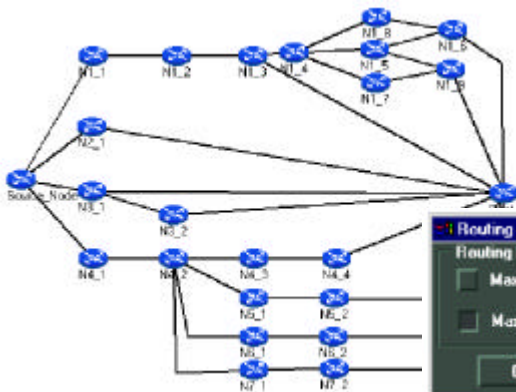
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Network Planning Tools: NetQuad Telephony

- Local/transit exchanges
- Traffic point to point (import for more complex affinity method)
- Routing can be computed or forced



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Network Planning Tools: NetQuad Telephony Results

Routing Table

Node Name	Traffic Source	Traffic Destination	Route Number	Traffic Type	Next Node Name	Share	Next Node Name	Share	Next Node Name	Share
Source_Node	Source_Node	Dest_Node	T1	1	N2_1	0.50	N3_1	0.50		
Source_Node	Source_Node	Dest_Node	T1	2	N1_1	1.00				
N1_1	Source_Node	Dest_Node	T1	1	N1_2	1.00				
N1_2	Source_Node	Dest_Node	T1	1	N1_3	1.00				
N2_1	Dest_Node	Source_Node	T1	1	Source_Node	1.00				
N2_1	Source_Node	Dest_Node	T1	1	Dest_Node	1.00				
N3_1	Dest_Node	Source_Node	T1	1	Source_Node	1.00				
N3_1	Source_Node	Dest_Node	T1	1	Dest_Node	1.00				
N3_1	Source_Node	Dest_Node	T1	2	N3_2	1.00				
N3_2	Dest_Node	Source_Node	T1	1	N3_1	1.00				
N3_2	Source_Node	Dest_Node	T1	1	Dest_Node	1.00				
N1_3	Source_Node	Dest_Node	T1	1	Dest_Node	1.00				
N1_3	Source_Node	Dest_Node	T1	2	N1_4	1.00				
N1_4	Source_Node	Dest_Node	T1	1	N1_3	1.00				
N1_4	Source_Node	Dest_Node	T1	2	N1_5	0.33	N1_8	0.33	N1_7	0.33
N1_8	Source_Node	Dest_Node	T1	1	N1_6	1.00				
N1_5	Source_Node	Dest_Node	T1	1	N1_6	0.50	N1_9	0.50		
N1_7	Source_Node	Dest_Node	T1	1	N1_9	1.00				
N1_6	Source_Node	Dest_Node	T1	1	Dest_Node	1.00				

- Lists for routes
 - Load-sharing
 - Overflow...



Network Planning Tools: NetQuad Telephony Results

- PCM can be 24,30 or 31 circuits size
- Cartographic view with colours
- End to end loss as a result
- No failure simulation available

Trunk's sizing report

Source Site	Source Node	Dest. Site	Dest. Node	Trunk	Min. Number of Circuits	Number of Circuits
top	Source_Node	top	N1_1	Source_Node_N1_1	0	0
top	Source_Node	top	N2_1	Source_Node_N2_1	42	62
top	Source_Node	top	N3_1	Source_Node_N3_1	42	62
top	Source_Node	top	N4_1	Source_Node_N4_1	0	0
top	N1_1	top	N1_2	N1_1_N1_2	0	0
top	N1_2	top	N1_3	N1_2_N1_3	0	0
top	N2_1	top	Dest_Node	N2_1_Dest_Node	42	62
top	N3_1	top	N3_2	N3_1_N3_2	0	0
top	N3_1	top	Dest_Node	N3_1_Dest_Node	42	62
top	N4_1	top	N4_2	N4_1_N4_2	0	0



Network Planning Tools: NetQuad IP



Août 2008: M-CP-CP-1-S-FQ/IMP
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Routeage (ex : Nombre Minimal de Sauts vs. OSPF)



HIGH TECHNOLOGY FOR TELECOMMUNICATION AND DISTRIBUTED SYSTEMS

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Network Planning Tools: NetQuad IP

Name	Node_1
Country	FRANCE
Site	NONE
X [deg]	-2.76225
Y [deg]	47.38812
In Order	<input type="checkbox"/>
Model	RipNode Custom
Manufacturer	Manu5
Device	Dev5
Capacity [pps]	6800
Transit Delay	<input type="checkbox"/>
Level	0
Weight	0
Extend	Level
	All Topology
Ok	Cancel

Node_1_Node_2 Node_1 - Node_2	
Name	Node_1_Node_2
Node 1	Node_1 Country FRANCE
Node 2	Node_2 Country FRANCE
Length (Km)	295.42 Update
In Order	<input type="checkbox"/>
Model	RipLink Custom
Operator	Telecom_2
Service	LL19280_T2
Data Rate [bps]	19200
Delay [s]	0
Compression Rate	1
Pre-Load [%]	0
Weight	0
Link Type	SL
Extend	Lock Operator
	Topology level
Ok	Cancel

- Nodes types and links can be declared as fixed or can be changed on bandwidth needs
- Equipment library to be done

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Network Planning Tools: NetQuad IP

• Traffic input

- Only one data can be introduced and generalised
- Imply high memory capacity for storage and computing

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Network Planning Tools: NetQuad IP Results

- Lists for routes and loads
- Failure simulation under Netquad basic module

Type	Link	IP	OSPF Zone	OSPF Metric	Reserved Bandwidth	Allocated Bandwidth	Usage Type
Link	Link1	192.168.1.1	0	1000000	0.000000	0.000000	ospfUp
Link	Back21_1_Back21_2	192.168.1.1	1	1	4000.0000	6000	ospfUp
Link	Back21_1_Back21_2	192.168.1.2	1	1	5000.0000	6000	ospfUp
Link	Back21_2_Back21_3	192.168.2.1	0	1	10000	10000	ospfUp
Link	Back21_2_Back21_3	192.168.2.2	1	1	0	0	ospfUp
Link	Back22_1_Back21_1	192.168.1.1	0	1	10000	15000	ospfUp
Link	Back21_1_Back22_2	192.168.1.1	1	1	10000	6000	ospfUp
Link	Back21_1_Back21_4	192.168.1.1	2	0	0	0	ospfUp
Link	Back21_1_Back21_1	192.168.1.1	1	1	4000.0000	6000	ospfUp
Link	Back21_1_Back21_3	192.168.1.1	1	1	4000.0000	6000	ospfUp
Link	Back21_4_Back21_1	192.168.1.1	1	1	0	0	ospfUp
Link	Back21_5_Back21_6	192.168.1.1	1	1	0	0	ospfUp
Link	Back21_6_Back21_2	192.168.1.1	1	1	5000.0000	6000	ospfUp
Link	Back21_2_Back21_2	192.168.1.1	1	1	5000.0000	6000	ospfUp
Link	Back22_1_Back22_1	192.168.2.1	1	1	0	0	ospfUp

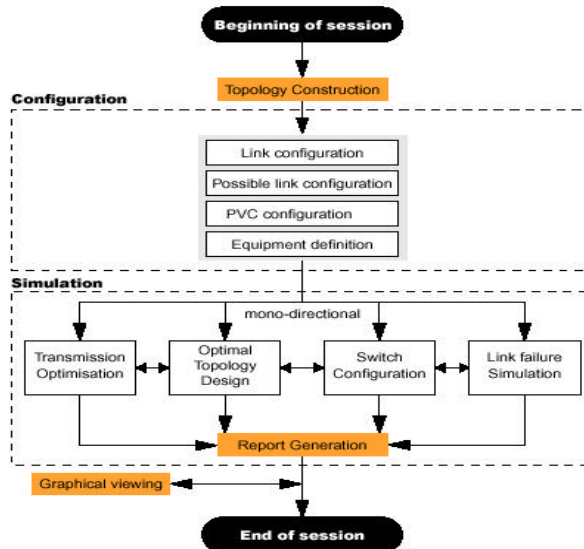
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Network Planning Tools: NetQuad ATM



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Network Planning Tools: NetQuad ATM



- Traffic per PVC basis can include PCR, SCR, UBR types...
- Equipment library to be done

The screenshot shows a dialog box titled "ATM Traffic Data". It contains a table for defining traffic data parameters:

Unit	PCR_0	PCR_01	SCR_0	SCR_01	MBS_0	MBS_01	MCR_0	MCR_01	Tag
Forward	0	700k							No
Backward	0	0							No

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Network Planning Tools: NetQuad ATM Results

Generated Report for TRUNK UTILIZATION INFORMATION:

Link Name	Src Site/Src Switch	Dest Site/Dest Switch	Dest Switch Traffic Class	Link T. (M)	Load T. (M)	Load (%)
Node_1_Node_2	Subnet_1/Node_1	Subnet_1/Node_2		75.00	0	
Node_1_Node_3	Subnet_1/Node_1	Subnet_1/Node_3	No traffic defined	0	0	
Node_1_Node_5	Subnet_1/Node_1	Subnet_3/Node_5	No traffic defined	0	0	
OTDLink_105	Subnet_1/Node_1	Subnet_3/Node_5				

Generated Report for UNROUTED PVCs:

Link Name	Src Site/Src Switch	Dest Site/Dest Switch	Bandwidth	Extra Cost	Cost/Month	Cost/Year	Cost/Year
Node_1_Node_2	Subnet_1/Node_1	Subnet_1/Node_2	T1	0	4086530	48828360	48828360
OTDLink_105	Subnet_1/Node_1	Subnet_3/Node_5	E3	0	10326200	123914400	123914400
Node_2_Node_3	Subnet_1/Node_2	Subnet_1/Node_3	T1	0	3362002	40344024	40344024
Node_3_Node_4	Subnet_3/Node_3	Subnet_1/Node_4	T1	0	4454592	53455104	53455104
Total cost						22094424	265127888

- Trunk utilisation and price

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Network Planning Tools: NetQuad ATM Results

Generated Report for ROUTING INFORMATION:

Name	Src Site/Src Switch	Dest Site/Dest Switch	Traffic	Cost(\$)	Rate(\$)	QoS	Number	Link Name Src Site/Dest Site
PVC_1	Subnet_1/Node_1	Subnet_1/Node_5	ATM	CRR	T1	1	1	
PVC_5	Subnet_1/Node_1	Subnet_3/Node_5	ATM	CRR	T1	1	2	

Generated Report for UNROUTED PVCs:

Name	Src Site/Src Switch	Dest Site/Dest Switch	Traffic	Cost(\$)	Rate(\$)	QoS	Number	Comment
PVC_2	Subnet_1/Node_1	Subnet_1/Node_5	ATM	CRR	T1	1	1	Too Much Fixed

- Detailed routing or unrouted PVCs
 - New routing to be applied by the user or less constraint on the link size and node load
- Failure simulation available

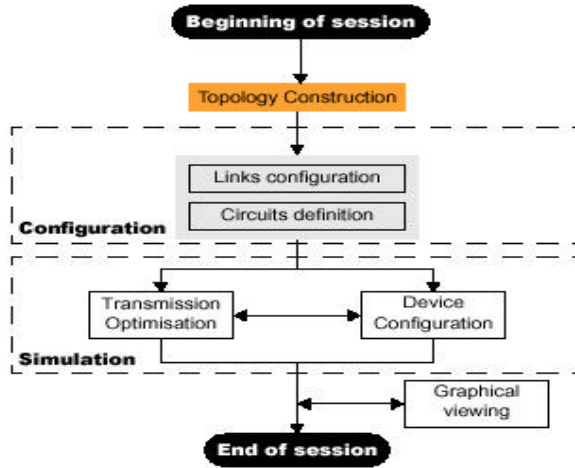
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Network Planning Tools: NetQuad SDH



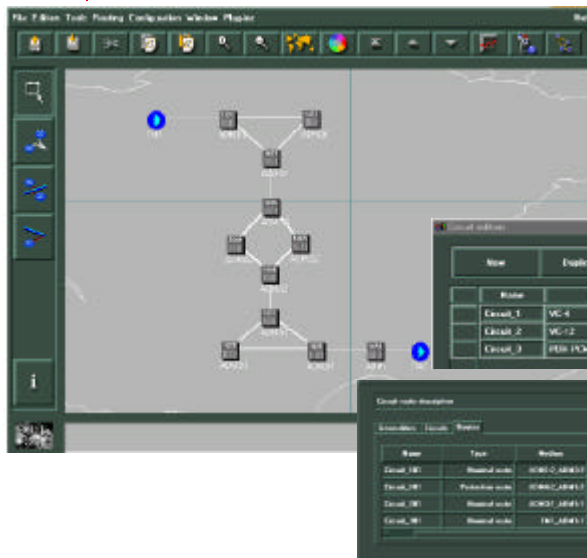
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Network Planning Tools: NetQuad SDH



- Distances based on Long/Lat co-ordinates
- Point to point traffic definition
- Manual definition of rings and ring size
- Equipment library to be done

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Network Planning Tools: NetQuad SDH Results

Name	Type	A End	B End	Total Bandwidth	Remaining Bandwidth	Cost
ADM12_ADM57	STM-16	ADM12/1/1/2/8	ADM12/1/1/2/8	1000 VC-12	802 VC-12	1
ADM12_ADM57	STM-16	ADM12/1/1/1/8	ADM12/1/1/1/8	1000 VC-12	802 VC-12	1
ADM12_ADM42	STM-16	ADM12/1/1/1/8	ADM12/1/1/1/8	1000 VC-12	345 VC-12	1
ADM12_ADM12	STM-16	ADM12/1/1/1/8	ADM12/1/1/1/8	1000 VC-12	345 VC-12	1
ADM11_ADM21	STM-4	ADM11/1/1/1/8	ADM11/1/1/1/8	252 VC-12	252 VC-12	1
ADM11_ADM31	STM-4	ADM11/1/1/1/8	ADM11/1/1/1/8	252 VC-12	252 VC-12	1
ADM11_ADM11	STM-4	ADM11/1/1/1/8	ADM11/1/1/1/8	252 VC-12	252 VC-12	1
ADM11_ADM53	STM-4	ADM11/1/1/1/8	ADM11/1/1/1/8	252 VC-12	252 VC-12	1
ADM11_ADM33	STM-4	ADM11/1/1/1/8	ADM11/1/1/1/8	252 VC-12	252 VC-12	1
ADM11_ADM13	STM-4	ADM11/1/1/1/8	ADM11/1/1/1/8	252 VC-12	252 VC-12	1
ADM11_ADM12	STM-1	ADM11/1/1/1/8	ADM11/1/1/1/8	63 VC-12	62 VC-12	1
ADM11_ADM11	STM-1	ADM11/1/1/1/8	ADM11/1/1/1/8	63 VC-12	62 VC-12	1

Device Configuration: ADM112

Final Floor

Buttons: Add Board, Remove Board, Add Chassis, Remove Chassis, Close

- All point to point routes and available bandwidth
- Precise definition of equipment library can be done under Script (modifying existing models)

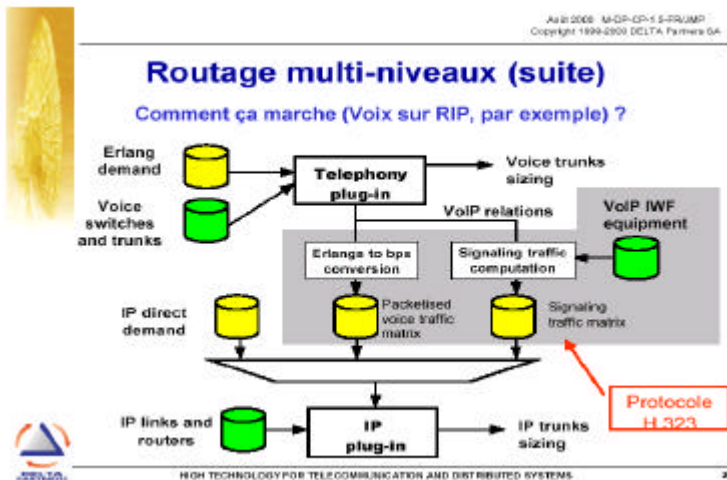
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Network Planning Tools: NetQuad VoIP



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Network Planning Tools: NetQuad VoIP

NetQuad - Services (Seattle) - Summary

Name: Seattle_Server Compute

Mode 1: Seattle Country: UNITED_STA

Mode 2: Denver Country: UNITED_STA

Length (Fts): 1638.46 Update

In Order: F

Model: RipLink Customs

Operator: US_carrier

Service: LL_T1

Data Rate (bps): 1544000

Delay (s): 0

Compression Rate: 1

File Load (T): 0

Weight: 0

Link Type: SL

Buttons: Cancel, Lock Operator, Topology level, Ok, Cancel



Microsoft Excel - Tel VoIP - Excel

	A	B	C	D	E	F
1		NY_FBC	M_FBC	D_FBC	S_FBC	CO_FBC
2	NY_FBC	1	0	0	0	0
3	M_FBC	0	1	0	0	0
4	D_FBC	0	0	1	0	0
5	S_FBC	0	0	0	1	0
6	CO_FBC	0	0	0	0	1

- Mixed of telephony and IP input

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Network Planning Tools: NetQuad VoIP

NetQuad - RIP Routing

Optimization Type: Cost Performance

Optimal Allowed:

Use Weight:

Number of Months: 1

Number of Iterations:

Maximize Budget: 0

Currency: USD

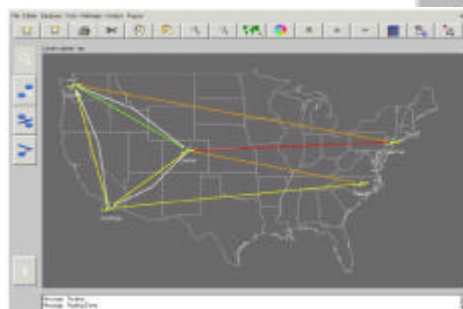
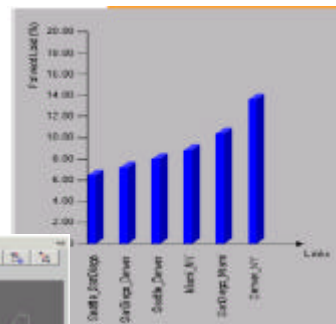
Packet Size (B): 1024

Node Max Load (%): 80

Link Max Load (%): 80

Buttons: Run, Cancel

- Mixed of results using IP routing laws



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Network Planning Tools: NetQuad Script

Exemple de script Positionnement de routeurs OSPF

```

{
inc 1, world, nodeNumbers;
string node1;
string site[10];
double X_Pos[10], Y_Pos[10];

HQ_Topology France_Net;
HQ_Node R0Node;
HQ_GeoSubNet H1_Dad;

NodeNumber = 10;

H1_Dad = HQ_SearchGeoSubNetByName("top");
node1 = "ospfNode1";
for (i=0; i<nodeNumber; i = i+1)
{
R0Node = HQ_NewNode ( France_Net, H1_Dad, site[i], node1, X_Pos[i], Y_Pos[i]);
R0Node.country = "FRANCE";
R0Node.site = site[i];
}
world = HQ_refreshTopology 0 ;
}

```

- Based on C language
- Includes all attributes of the objects that can be found and enhanced in Netquad



HIGH TECHNOLOGY FOR TELECOMMUNICATION AND DISTRIBUTED SYSTEMS

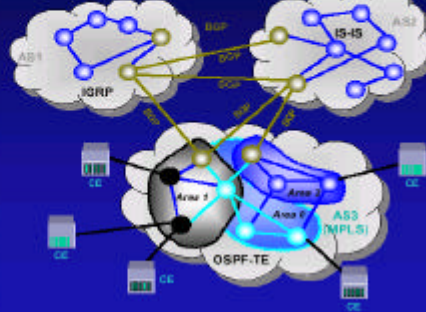


Dimensioning tool Netquad MPLS Phase 1



NetQUAD: Outil Général pour Réseaux IP

- Les systèmes Autonomes
- Protocole BGP4 pour un nombre d'AS quelconque
- Plusieurs protocoles IGP
- Traitement des zones dans OSPF
- MPLS avec OSPF-TE ou IS-IS-TE
- Domaines DiffServ
- Calcul des tables de routage IP
- Traitement simultané du routage IP et des LSP
- Propagation des trafics
- Trace précise des flux de bout en bout, par classe de service, sur une interface ...





Dimensioning tool Netquad MPLS Phase 2

NetQUAD: Modélisation Précise des Performances

- Théorie du trafic différentiel
- Simulation Hybride
- Flux non Poissonniens, trafics TCP ...
- Evaluation précise des délais et des pertes dans chaque « device » du réseau
- Evaluation des performances de bout en bout et en cœur de réseau
- Routeurs DiffServ (Policy, shaping, priority queuing, WFQ ...)

Sources de Trafic

- Multimedia
- Voice traffic
- Video traffic
- Data traffic
- IP traffic (TCP, UDP, Tunnel, FTP)

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