



ESRI International User Conference 2003



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Vodafone **F**ixed network-**V**isualization-**T**ool for ArcView GIS

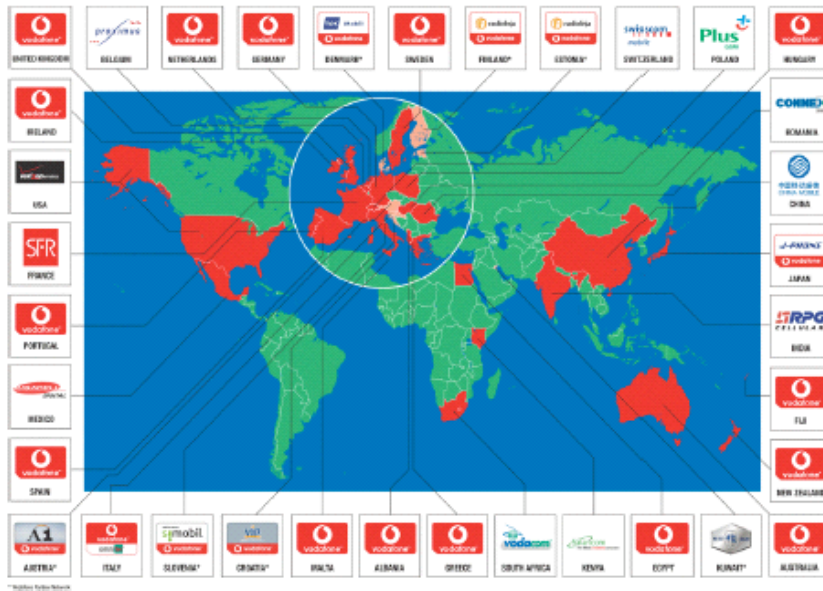
About





The Company – its Success – its Future

Global Communication



The largest mobile telecommunications company worldwide

- has stakes in mobile networks in 28 countries on 5 continents and has in eight more countries partner companies
- has more than 120 million customers worldwide

Under the Sign of Progress

Vodafone D2 GmbH is pioneering in telecommunications – a success story.

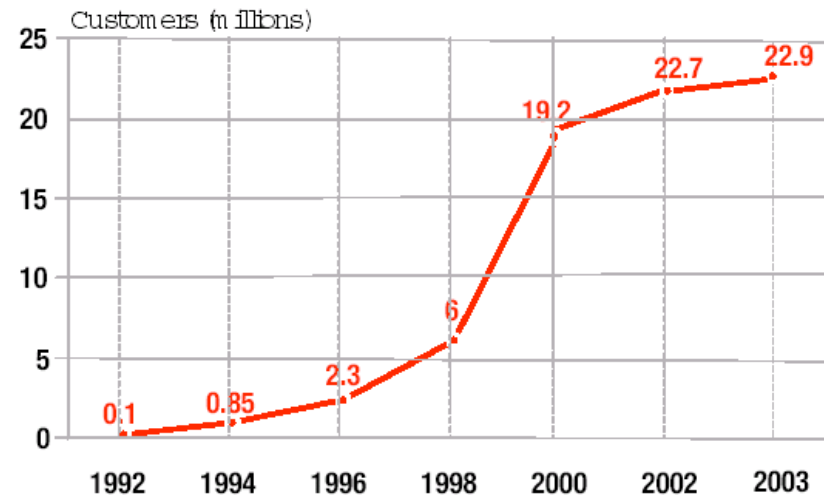
The company

- is growing since its launch in 1992
- helped the GSM* technology to its breakthrough
- has approx. 22.9 million customers
- has reached a market share of 38.2 per cent
- has never ceased to make profits since 1993
- employs more than 9,000 employees

* GSM: Global System for Mobile Communication
Note: current figures refer to March 2003

Development in Customer Numbers

Since its launch, Vodafone D2 has kept on growing - from 100,000 customers in 1992 to a current figure of around 22.9 million (March 2003).



Milestones

- 1989:** Mannesmann is awarded the D2 licence
- 1992:** The commercial network operation starts
- 1993:** The breakeven point is reached
- 1995:** One million customers in the D2 network
- 1995:** Launch of the Short Message Services (SMS)
- 1997:** Introduction of the prepaid product D2 CallYa
- 1998:** For the first time more than 5 million customers
- 1999:** The Internet goes mobile: D2 WAP
- 2000:** D2 buys UMTS licence at auction – 15 million customers
- 2001:** Launch of GPRS*
- 2002:** Start of Vodafone live! (camera phone, MMS etc.)

*GPRS: General Packet Radio Service
(Technology, which improves the data transfer)

Part of a Strong Group

Of the ten largest mobile telecommunications companies in Europe, three belong to the Vodafone Group (31.03.2003).

T-Mobile:	24.89 Mio.
TIM:	24.7 Mio.
Vodafone D2:	22.9 Mio.
Telefonica Moviles:	18.58 Mio.
Vodafone Omnitel:	18.4 Mio.
Orange France:	18.2 Mio.
Orange UK:	13.31 Mio.
Vodafone UK:	12.4 Mio.
O2 UK:	12.14 Mio.
T-Mobile UK:	12 Mio.

High Quality – in Technology and Service

Vodafone D2's success is based on two pillars.

Quality of the Network

- network coverage is almost nationwide
- high quality and stability of the network
- more than 16,500 antenna sites and 40,000 radio cells

Excellent Service

- proximity to the customer
- decentralised distribution with 8 regional branches
- own chain of outlets with 200 shops
- more than 10,000 dealers and 8 service providers

Figures as of March 2003

From SMS via MMS to UMTS

More than mere voice transmission: After the Short Message Service (SMS), the new Multimedia Service MMS paves the way for the UMTS future.

Trends:

- In 2001, approx. 10 billion short messages were sent in Vodafone D2's network
- Multimedia messaging offers the possibility of sending photos, sound files and long texts. Vodafone D2 was the first German network operator to start this service in April 2002
- In 2002/2003 the data transmission accounts for 16.4 per cent of the mobile telecommunications usage
- In September 2002 start of Vodafone m-pay – via mobile phone shopping and paying in WAP and Web
- Vodafone live! (camera phone, MMS etc.): 400,000 sold Vodafone live!-mobiles and in total 600,000 sold camera phones (End of March 2003)

Steps into the Future

- 1995:** Vodafone D2 convenes first UMTS World Congress
- 1998:** Reaching an agreement on UMTS standard
- 1999:** Vodafone D2 sets up first UMTS test network
- 2000:** Award for UMTS licence
- 2001:** First voice and data calls
- 2003:** *The launch date will depend on the availability and quality of the mobiles*
- 2003:** *UMTS network is to provide coverage for 25 % of the population*
- 2005:** *Network coverage of 50 % is intended*

The Next Generation

On August 17, 2000 the company was awarded the licence for a UMTS* licence. A completely new generation of mobile telecommunications - with totally new dimensions

- Highspeed access to the Internet
- Live video and other multimedia applications
- Interactive personal digital assistant

*UMTS: Universal Mobile Telecom System (new transmission standard)

About



Fixed network Visualisation Tool

Requirements for D2-FVT:

- keeping track of an increasing number of network elements, lines and connections
- provide an exact and global overview of the fixed network
- Visualization of all data from our Fixed Network Documentation area

e.g. --> physical and logical network

- Detail information about visualized data should be available in D2-FVT

e.g. --> details regarding integrated equipment

--> details regarding different views of the network

GSM, SDH, ATM, UMTS

- Different presentation means

e.g.

--> wiring level of leased lines and radio links

--> status of integrated equipment

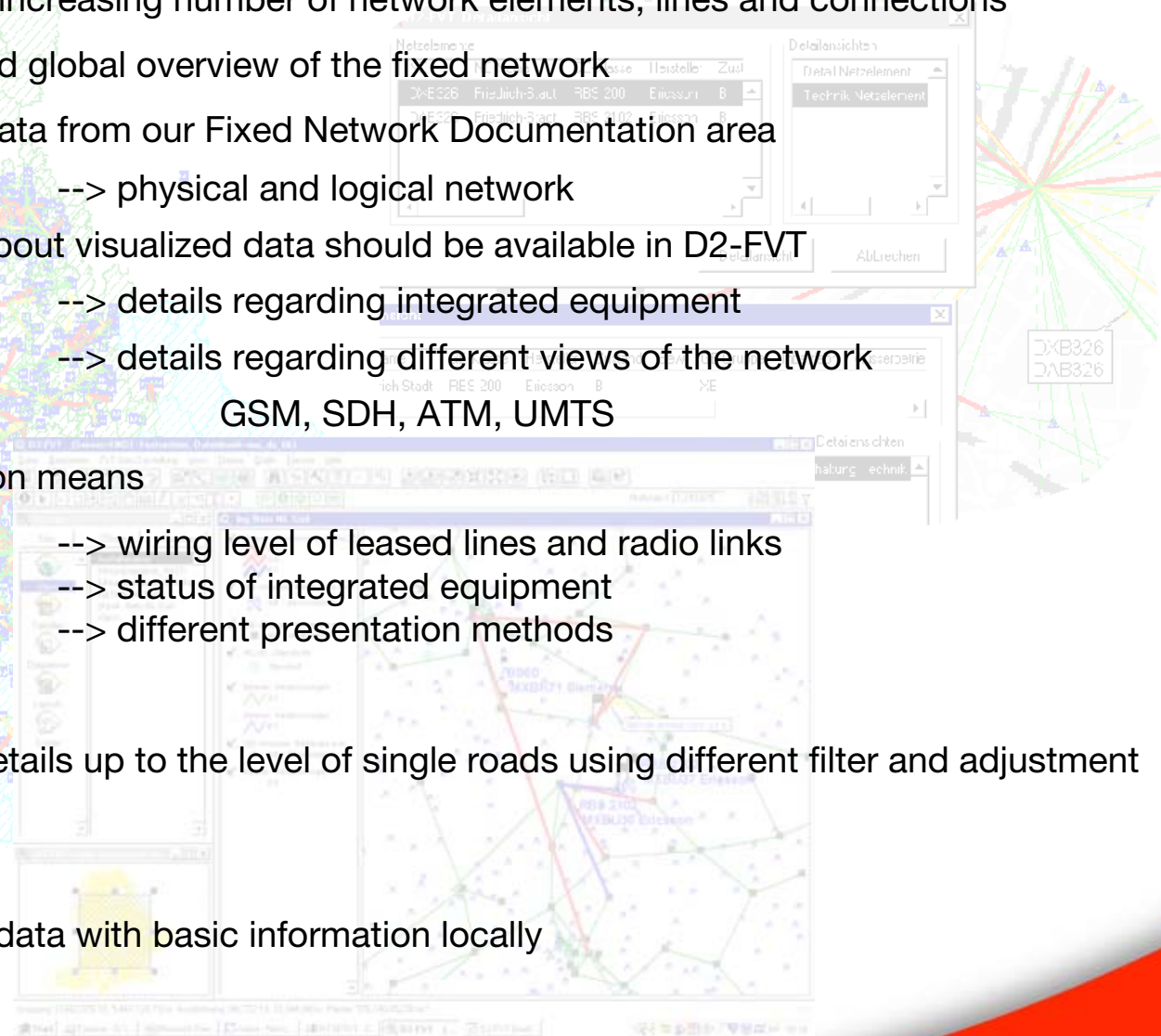
--> different presentation methods

- Clarity/handling

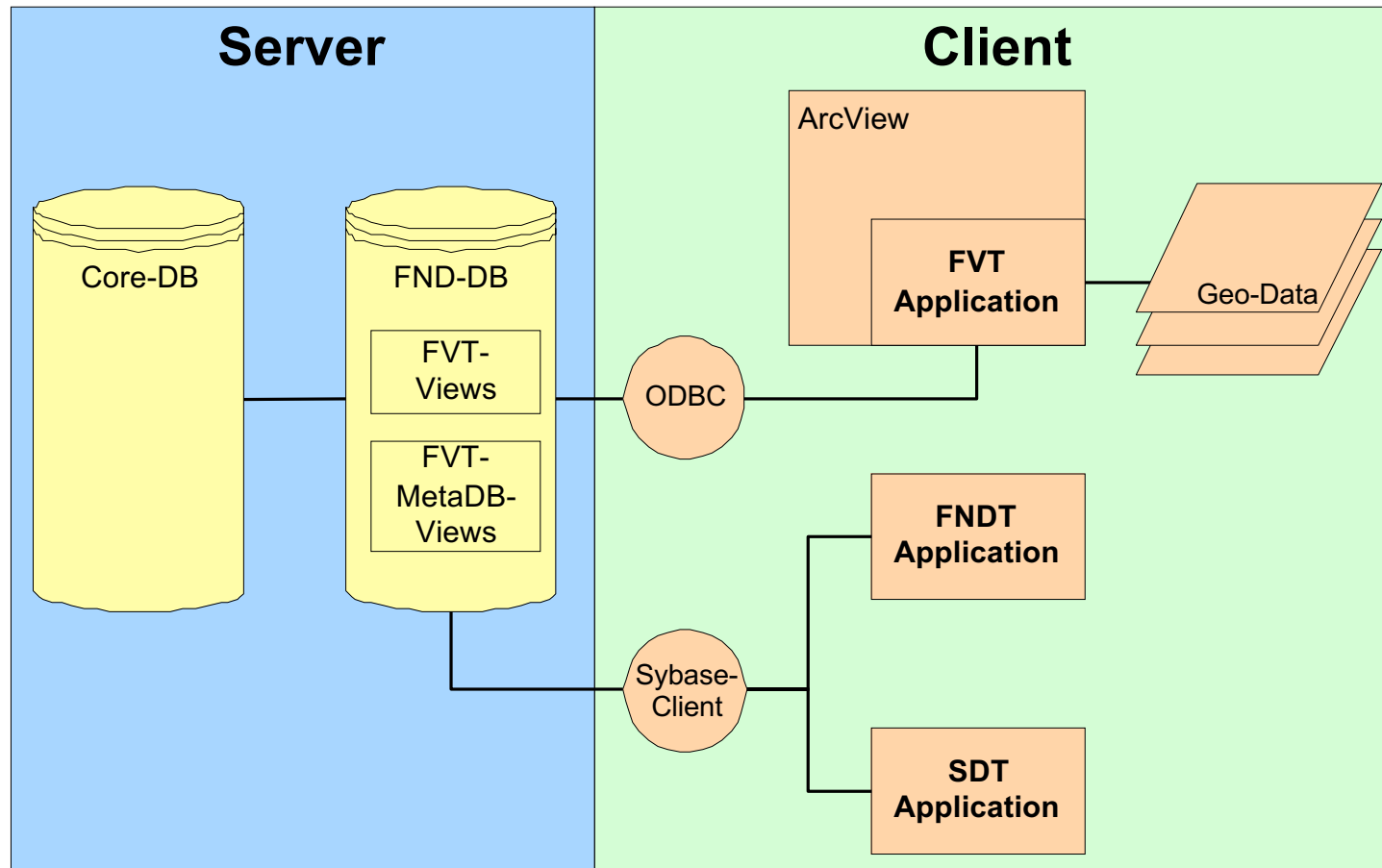
show network details up to the level of single roads using different filter and adjustment methods

- Flexibility

store maps and data with basic information locally



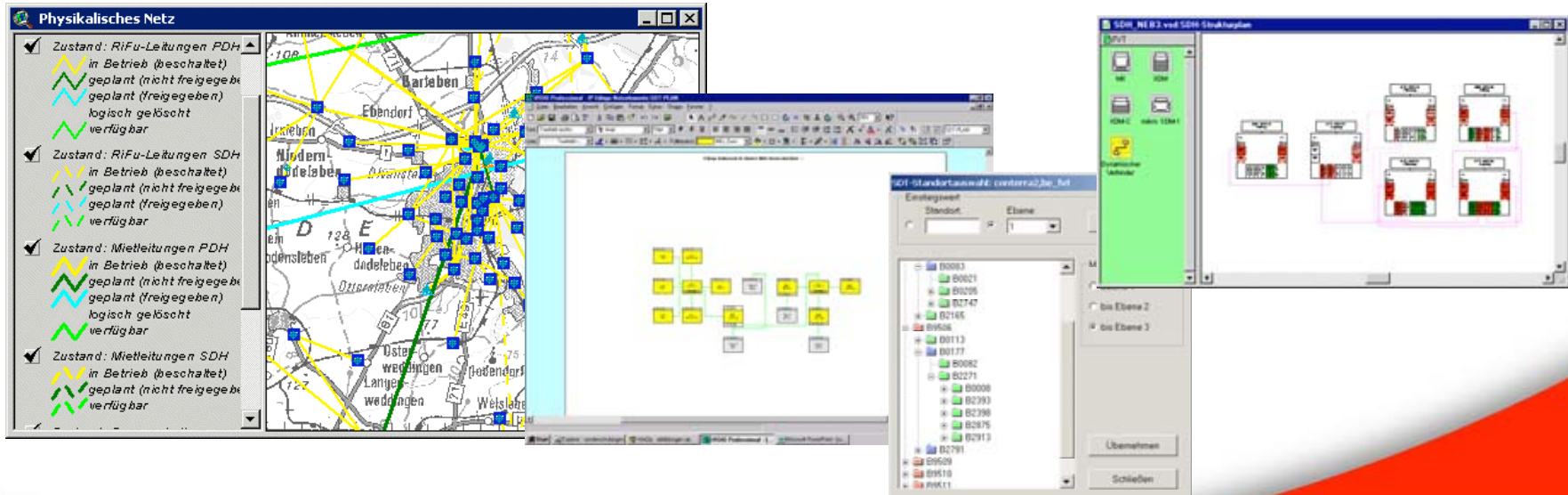
FVT-Database Access



The Application FVT consists of following components:

The “Geo. Component” (the ArcView Component) and 2 Extensions for ArcView

- The Visio Component called the “Schematic Presentation“
- The “Hierarchy Component” implemented with Visual Basic



The Geo-presentation

The “Geographic presentation” makes it possible to visualize the entire network or a part of it on a geographic map. The logical and physical network can be shown on different levels and in different capacities by using various level and filter characteristics.

- BTS binding
- BSC areas / MSC areas
- Detail information regarding network elements and the corresponding integrated equipment
- Connections and corresponding routing
- Routing Analysis
- Failure Analysis
- ...

Screenshot of the "Geo. Component" showing a "Detail-Info"

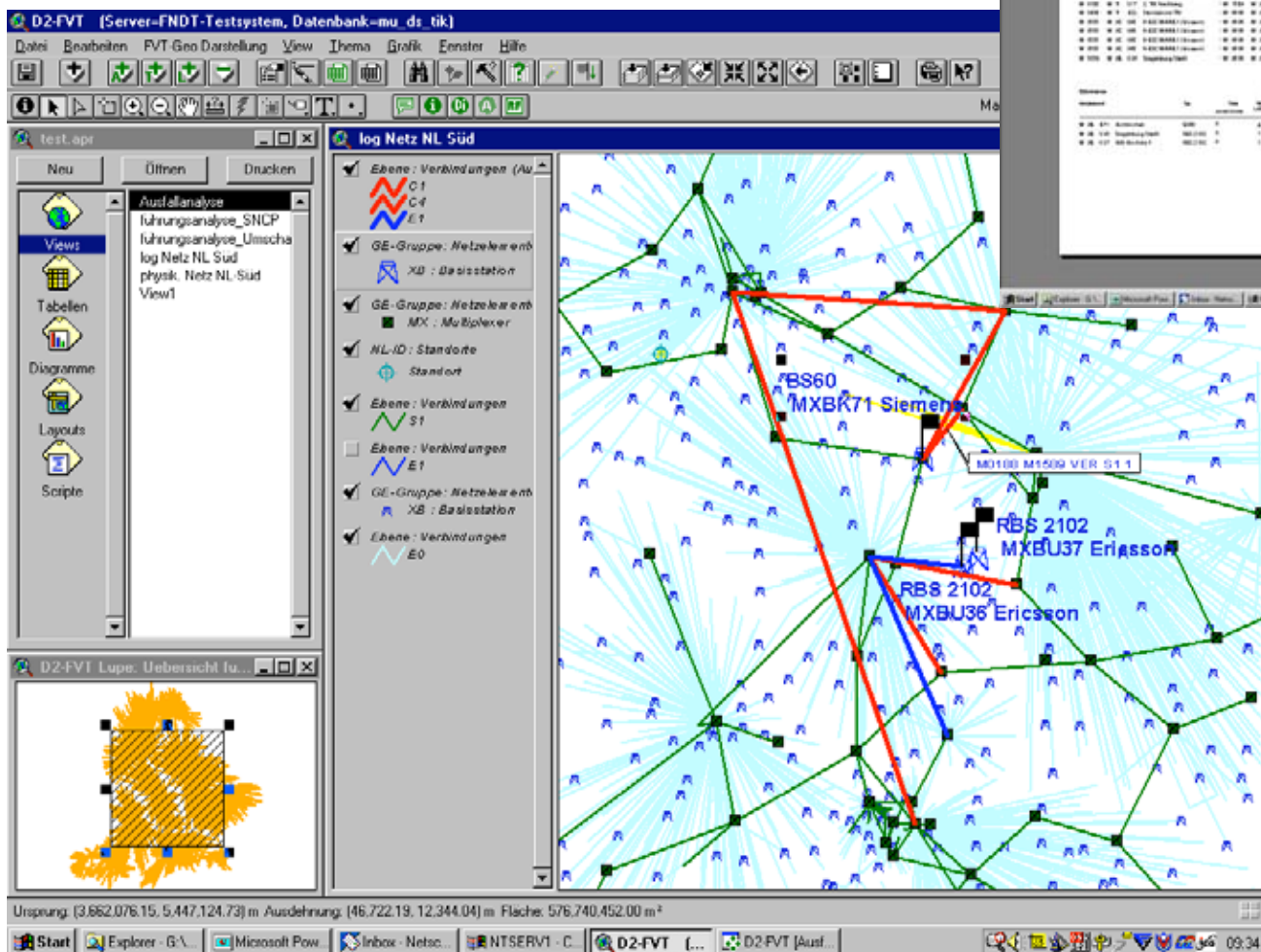
The screenshot displays a software interface for a network management system. The main window shows a map of Germany with various network elements marked. A detailed information window is open, showing the following data:

Ne	NE Name	GE-Klasse	Hersteller	Zustand	Bew	GE-Gruppe	Inbetriebn.	Ausserbetriebn.	CLIC
MDE006	NRBGPP3	Passport 7480	Nortel	B		DE			NRBGPP3

Gestell	Untergestell	Steckplatz	Baugruppe	Betriebsart	Zustand	Fkt_b1
Shelf	-	01	8p E1-IMA-FP	E1-IMA-K. (MSB)	B	IA 001
Shelf	-	01	8p E1-IMA-FP	E1-IMA-K. (MSB)	B	IA 001
Shelf	-	01	8p E1-IMA-FP	E1-IMA-K. (MSB)	B	IA 001
Shelf	-	01	8p E1-IMA-FP	E1-IMA-K. (MSB)	B	IA 001

The interface also includes a legend for network elements (RT: Router, SG: Serving GPRS Support Node, etc.) and a taskbar at the bottom showing the Windows Start button and several open applications.

Failure Analysis for STM1 LL

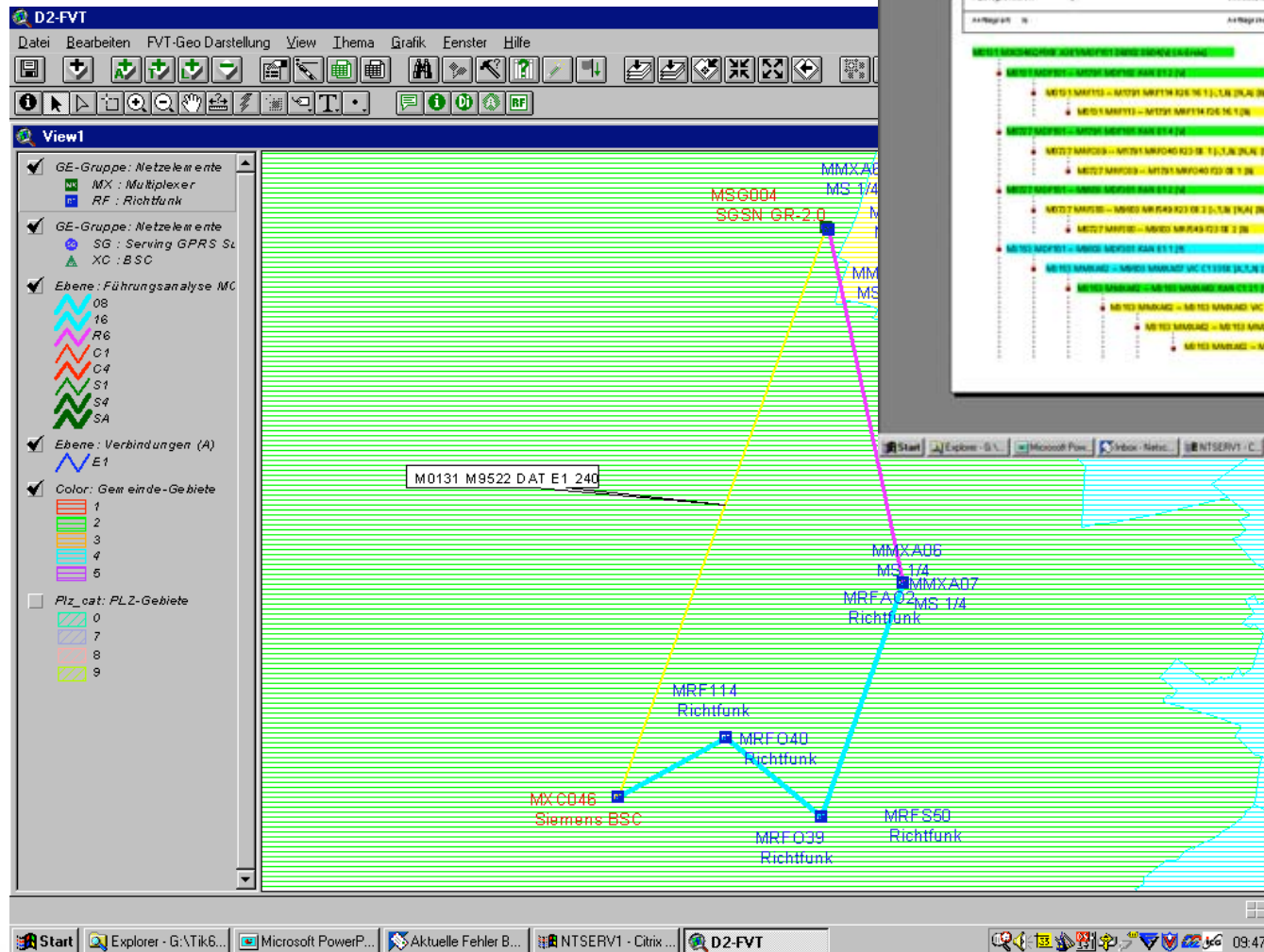


The screenshot shows a window titled 'Ausfallanalyse' (Failure Analysis) with a table of data. The table has multiple columns, likely representing different parameters or metrics related to the failure analysis. The data is organized in a structured format, possibly a grid or table.

Failure Analysis Report



Routing Analysis for E1-Connection



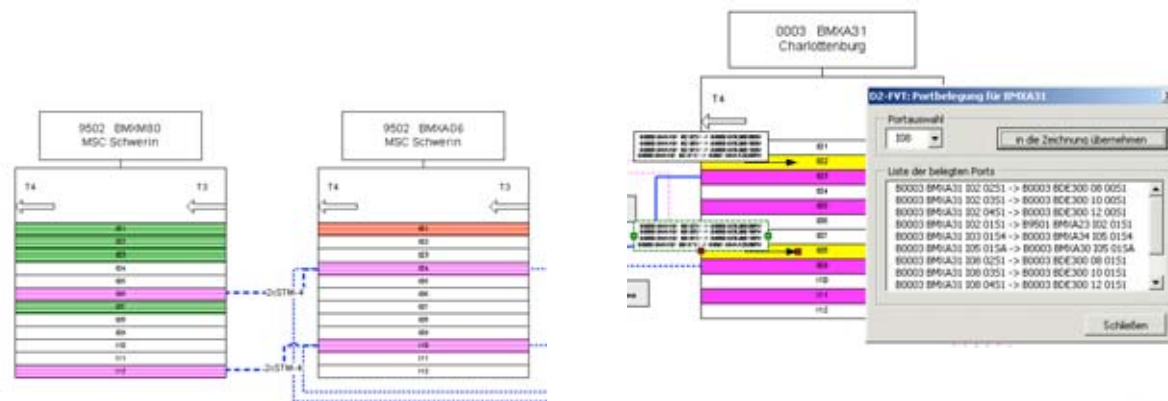
Routing Analysis Report

The schematic presentation with Visio

The schematic presentation consists of a Visio-drawing presenting network elements and their logical connection to a location.

Multiple Visio drawings can be generated, for example:

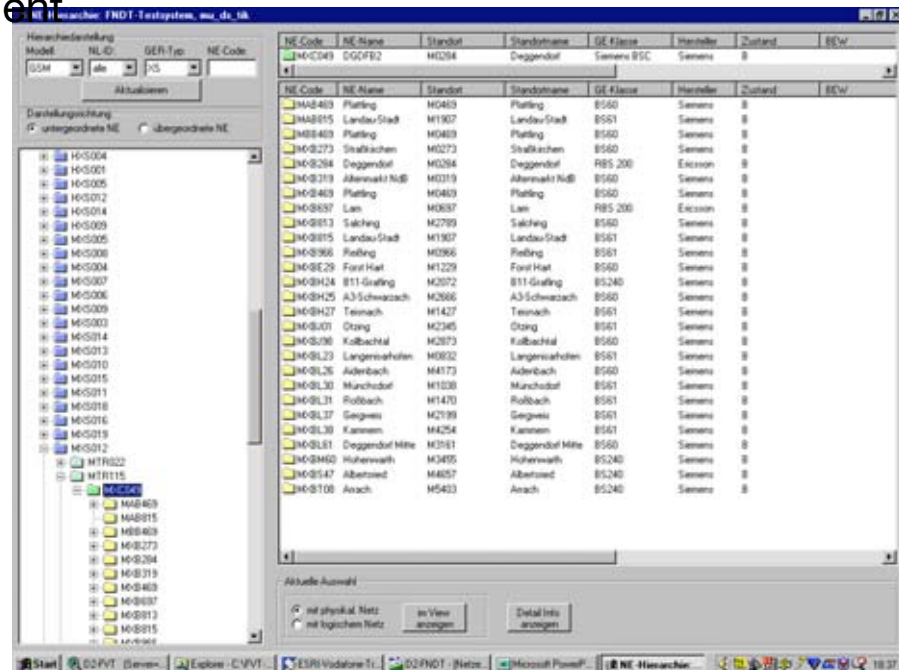
- SDH-Plan: SDH Multiplexer or ATM Multiplexers and their logical connections
- Cluster-Plan: BSC Area and all corresponding Network elements
- IP-Network Elements and their logical connections in a defined location
- IP-Way (IP-Services routing information between two IP-Network elements)
- ...



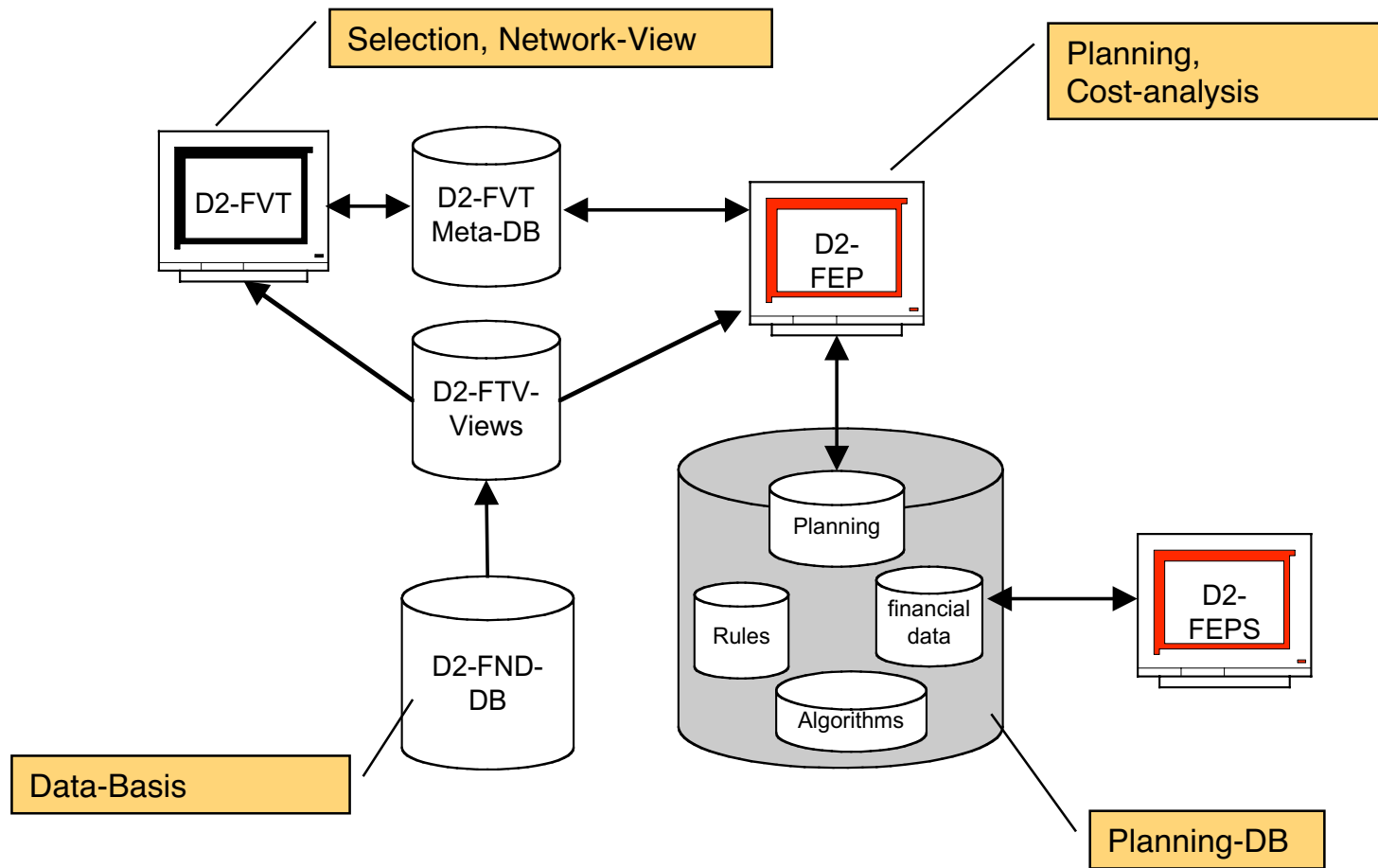
The hierarchy presentation

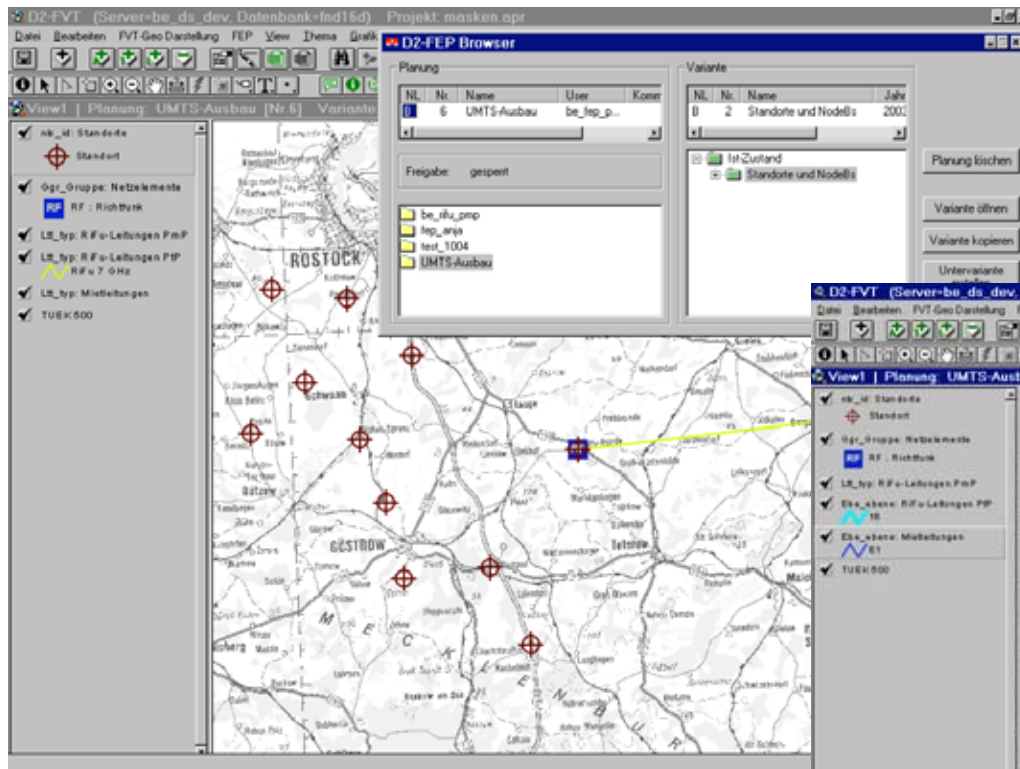
The hierarchy presentation shows the GSM network elements (look and feel like Windows Explorer):

- Quick overview of the network structure
- Quick BSC-BTS or RNC-Node B classification
- Possibility to switch to Geo. Component
- BTS/Node B connection
--> failure analysis
- BSC/RNC areas
- MSC areas

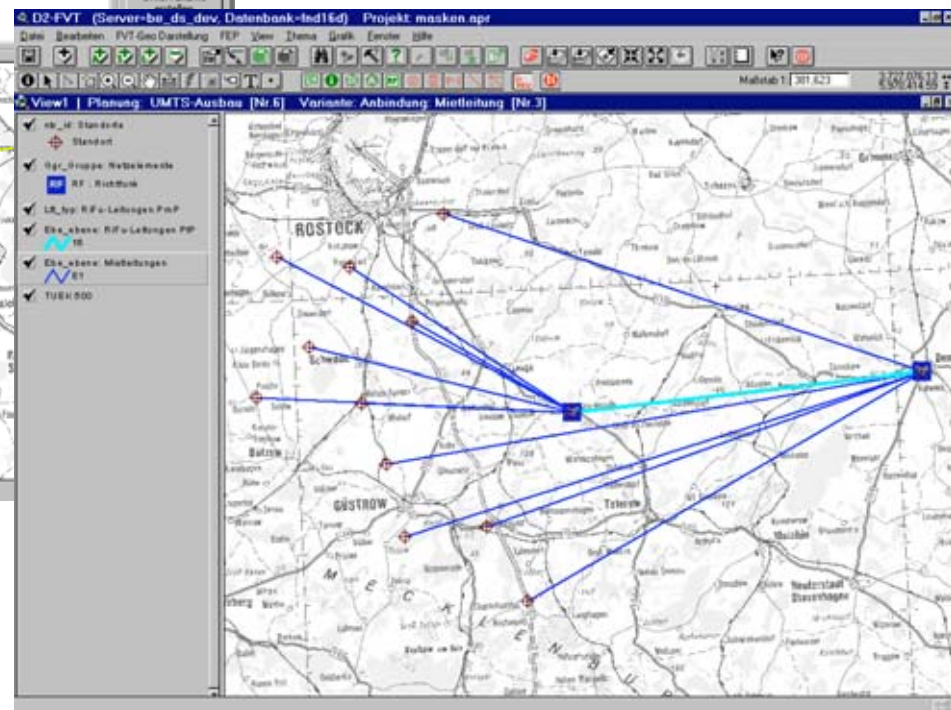


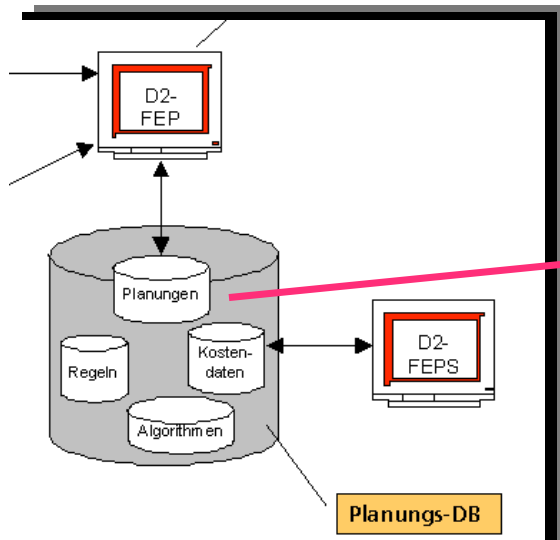
Planning Component FEP-->Database Access



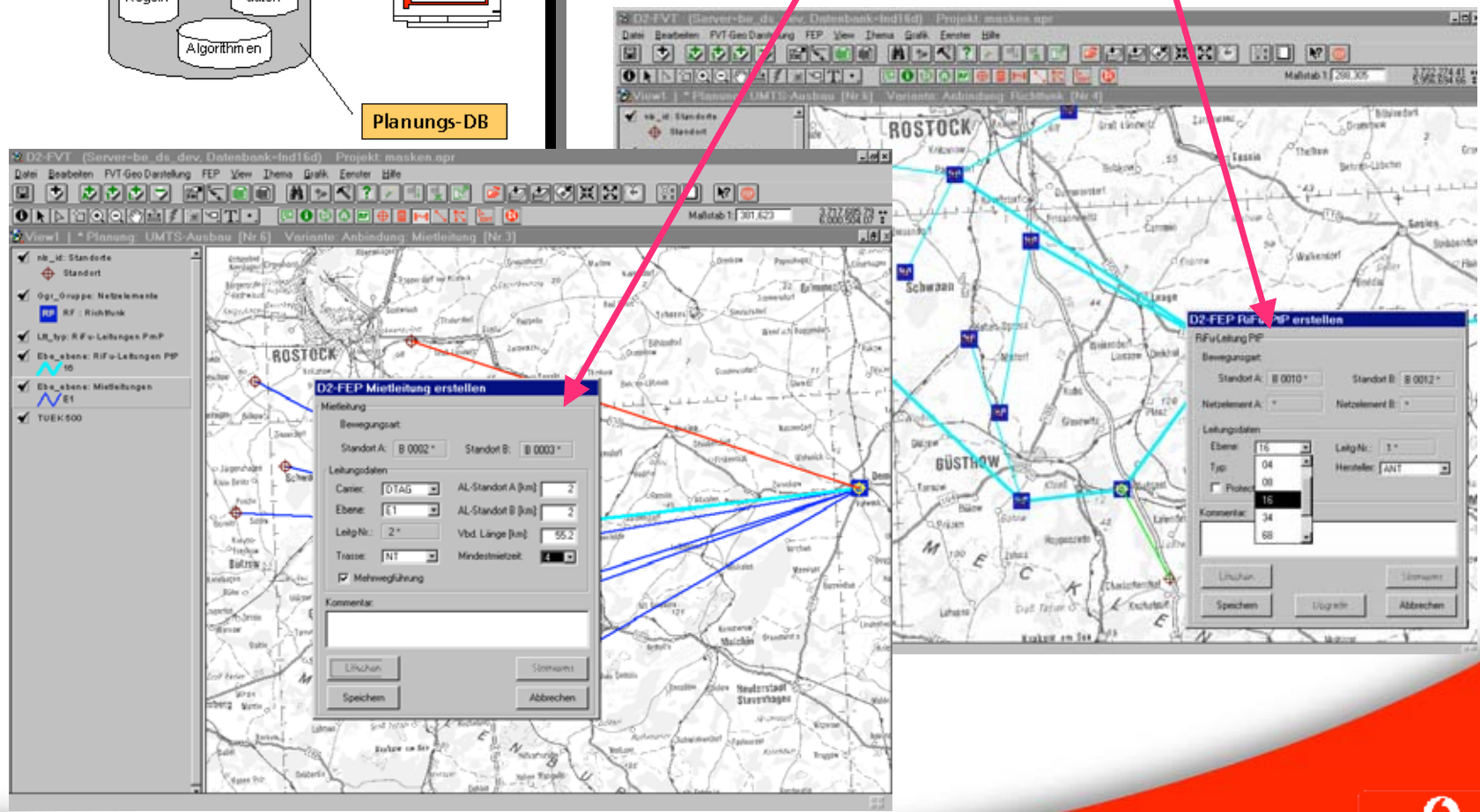


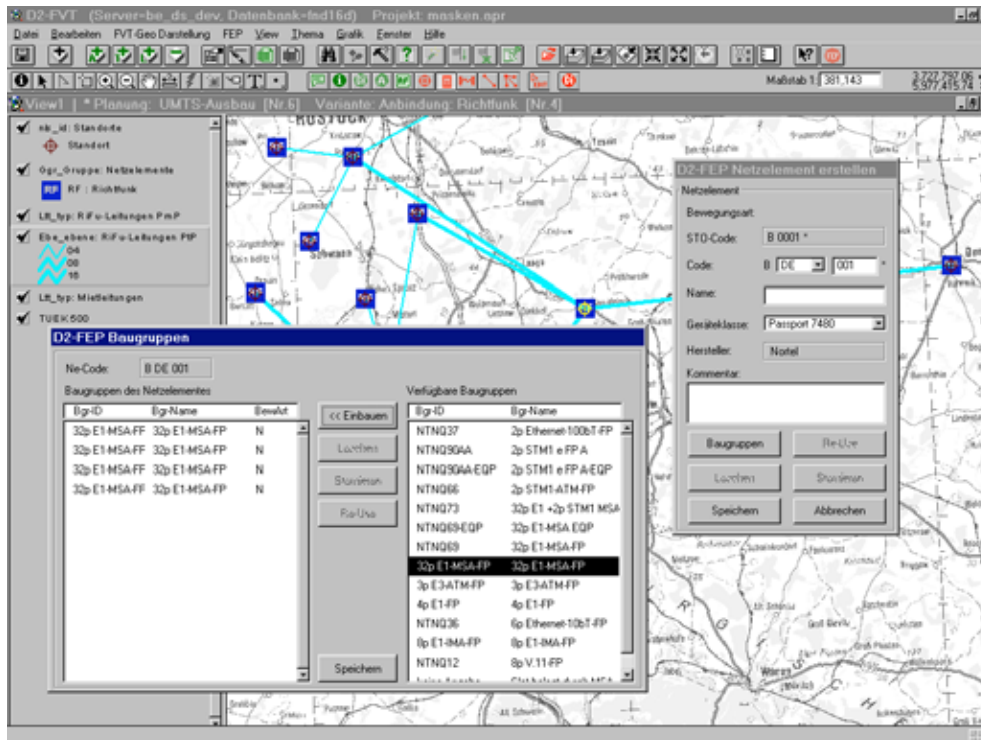
The “planning view” is generated from FVT and will be used exclusively for future planning. All planning results will be stored in the database.



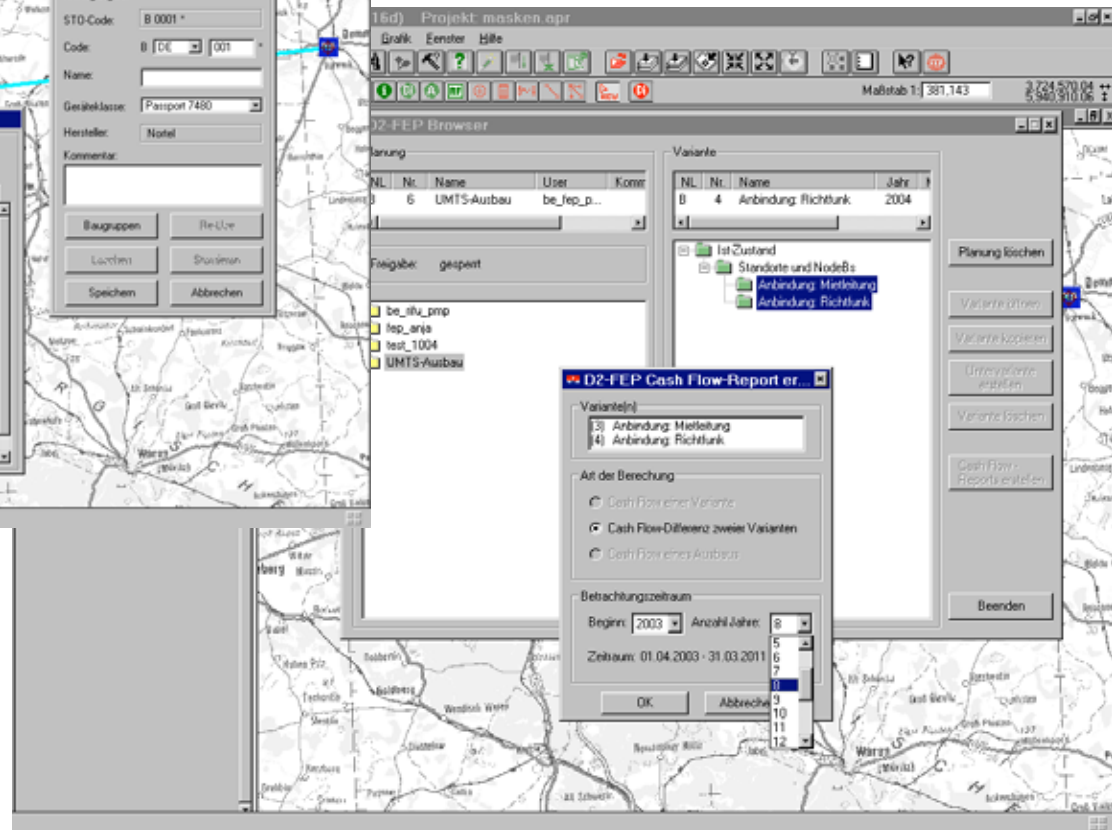


The configuration parameters used to create new Links for alternative connections (Microwave or LL) are managed by the “Database Config Tool”





A variety of reports, e.g. cost analysis for a planned network expansion or for an existing network can be generated with the tool.



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Questions...?