Vodafone Fixed network-Visualization-Tool for ArcView GIS
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

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

### 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

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**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

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

**Server**
- Core-DB
- FND-DB
  - FVT-Views
  - FVT-MetaDB-Views

**Client**
- ArcView
  - FVT Application
- Geo-Data
  - FNDT Application
  - SDT Application

Connectors:
- ODBC
- Sybase-Client
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”
Failure Analysis for STM1 LL

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

Selection, Network-View

D2-FVT
D2-FVT Meta-DB
D2-FTV-Views

D2-FND-DB

Planning
Rules
financial data

Algorithms

D2-FEPS

Planning, Cost-analysis

Data-Basis

Planning-DB
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.
Also for Management...
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Questions...?