Correlation of Business Data–

web-based analyzing system as a specific

Decision Support System

Jürgen Kußberger
Dipl.Ing. (FH),
M.Sc. (GIS)

2013 Esri Europe, Middle East and Africa User Conference
October 23-25, 2013 | **Munich, Germany**

Kabel Deutschland

Agenda

Summary

The division „Network Planning & Build" implemented a webbased GIS along with ArcGIS Server, Geonis and WebOffice-technology. The WebGIS delivers valuable decision support for strategic questions at regional and national level.

The application enables planning – experts, as well as other users without professional background, to obtain a quick outline about the Broadband Network - Infrastructure and provides a large number of different data views.

The data which at present are shown in the WebGIS are from different source systems and weren't available before in one single application yet.

The application is constantly being expanded and activated for even more users.

Company

Largest cable network provider in Germany

- 15,3 Million households suitable for connection
- 8,5 Million customers, 7,6 Millionen direct customers

Largest distribution area in Germany

- 13 out of 16 Federal States with 22,3 Million households
- "Top 3" - Cities: Berlin, Hamburg, Munich

Infrastructure[2]

- 82% of the network is modernized for using new services
- 83% of this share is upgraded for Docsis 3.0 (100 Mbit/s)

Strong growth dynamics in the financial year 2012/13

- 7,7% increase in sales up to €1,8 Mrd.
- 8,4% EBITDA[1]-increase up to €862 Mio.
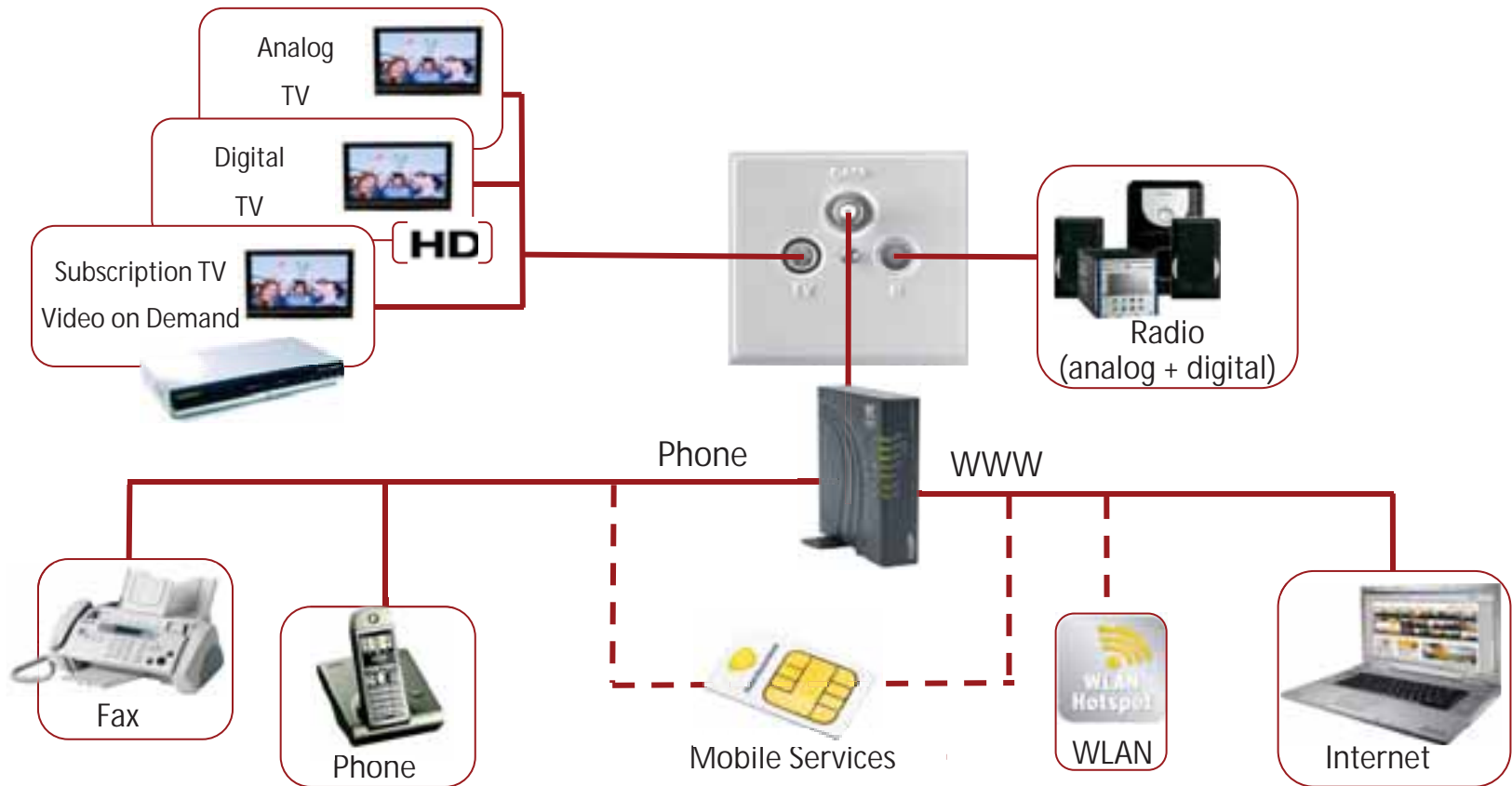- Profit after tax €247 Mio. (previous year €159 Mio.)

KD Distribution Area

[1] Bereinigtes EBITDA: Betriebsergebnis vor Abschreibungen, Aufwand für LTIP, Aufwand für Akquisitionen und Normenänderungen sowie Aufwand aus Restrukturierung / rechtliche Reorganisation (gilt für die gesamte Präsentation)
[2] Status 31. März 2013

▶ Products

Analog TV

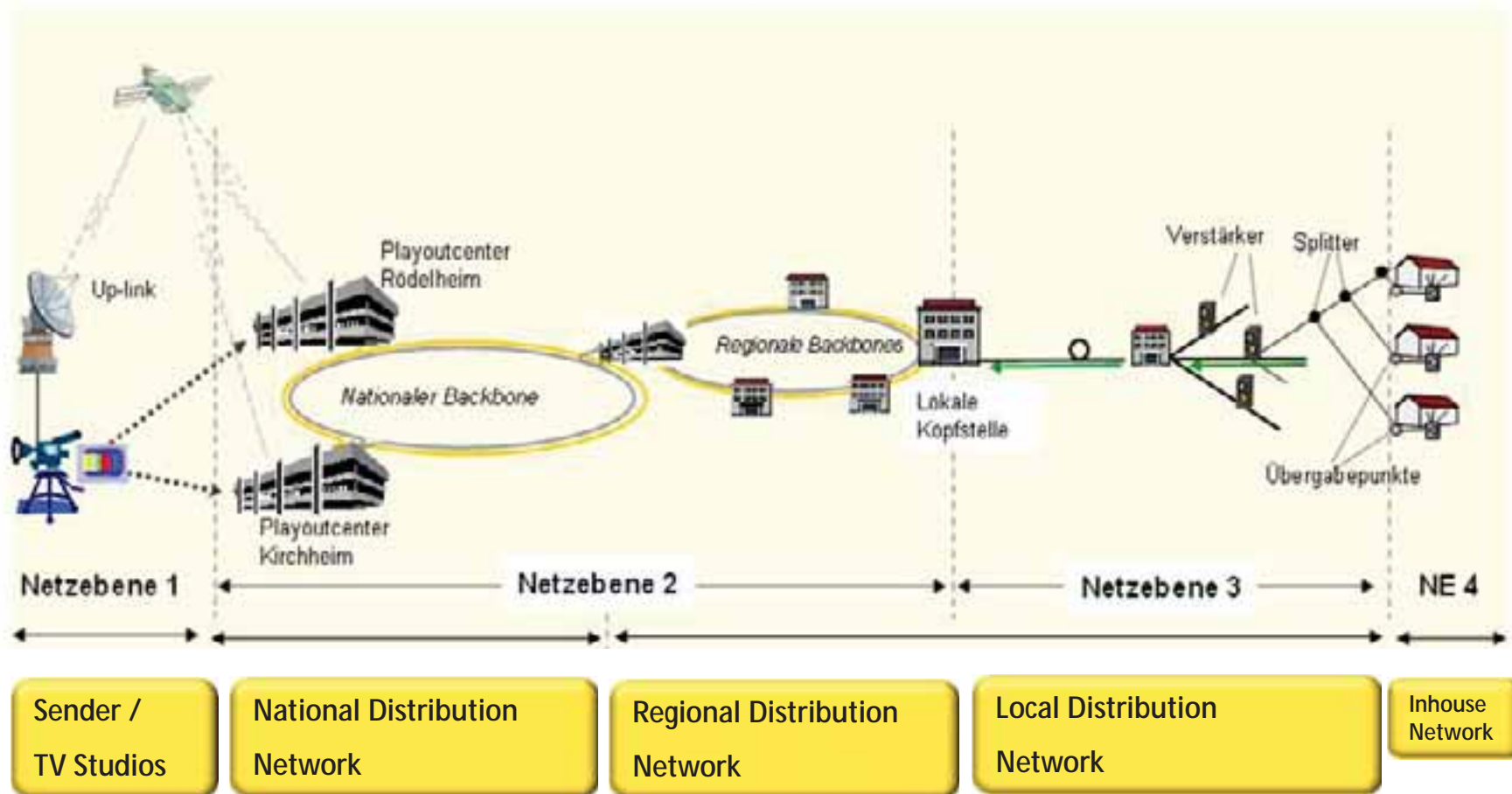Digital TV

HD

Subscription TV
Video on Demand

Radio
(analog + digital)

Phone

WWW

Fax

Phone

Mobile Services

WLAN
Hotspot

WLAN

Internet

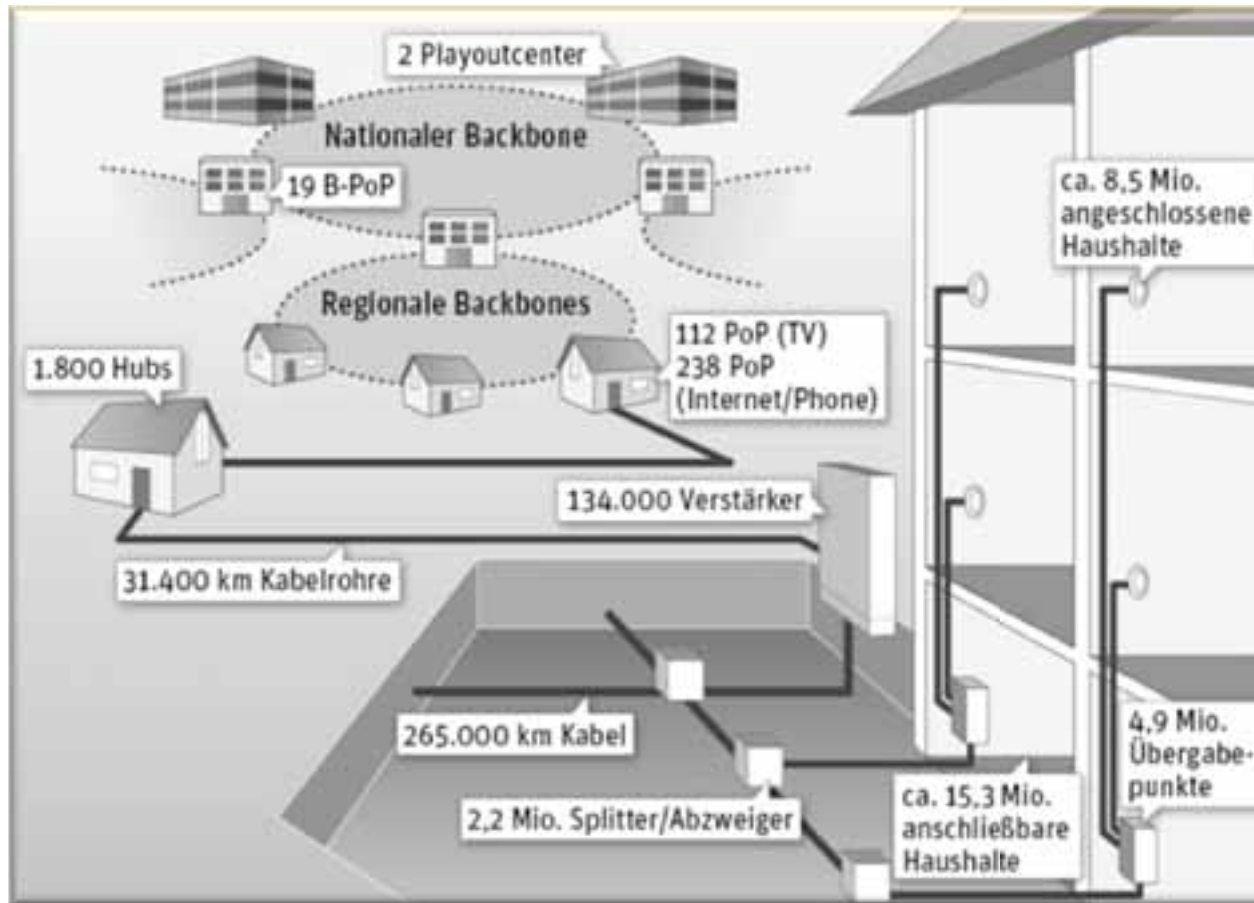**Dynamic, fast growing markets require highly efficient networks!**

Infrastructure + Hierarchy

Kabel Deutschland`s Broadband Network - Infrastructure
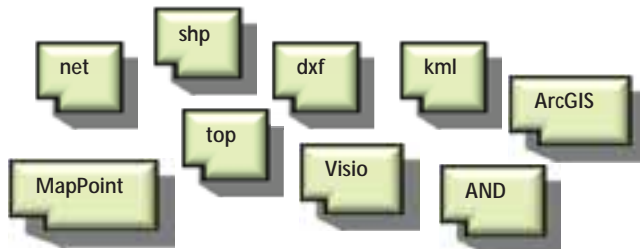
Quantity Structure

Characteristics

High Reliability
(Network Availability 99,8%)

Extensive Upgrade
of upstream channels for
Internet and Telephony
(high bandwith)

Extensive TV- and
Radio-Programming
up to 32 analog channels
>200 digital slots
HDTV

Stand: März 2013

Scope

net

shp

dxf

kml

ArcGIS

top

MapPoint

Visio

AND

Characteristics

Data Structure

- **high variability and heterogeneity**
- **different formats, origins, quality**

Applications

- **large number of different GIS-Applications, Geo-Viewers etc.**

Data Volume

- **generally high data volume**

Objectives

Data Structure

- **reduce heterogeneity**
- **unificate and standardize**
- **improve quality**

Applications

- **replace "isolated applications" successively by using one single geodata-platform**

Data Volume

- **effective data-management**
- **high-performance data-access**

+

Implementing a Geodata-Platform

- **provide new data-views „on demand"**
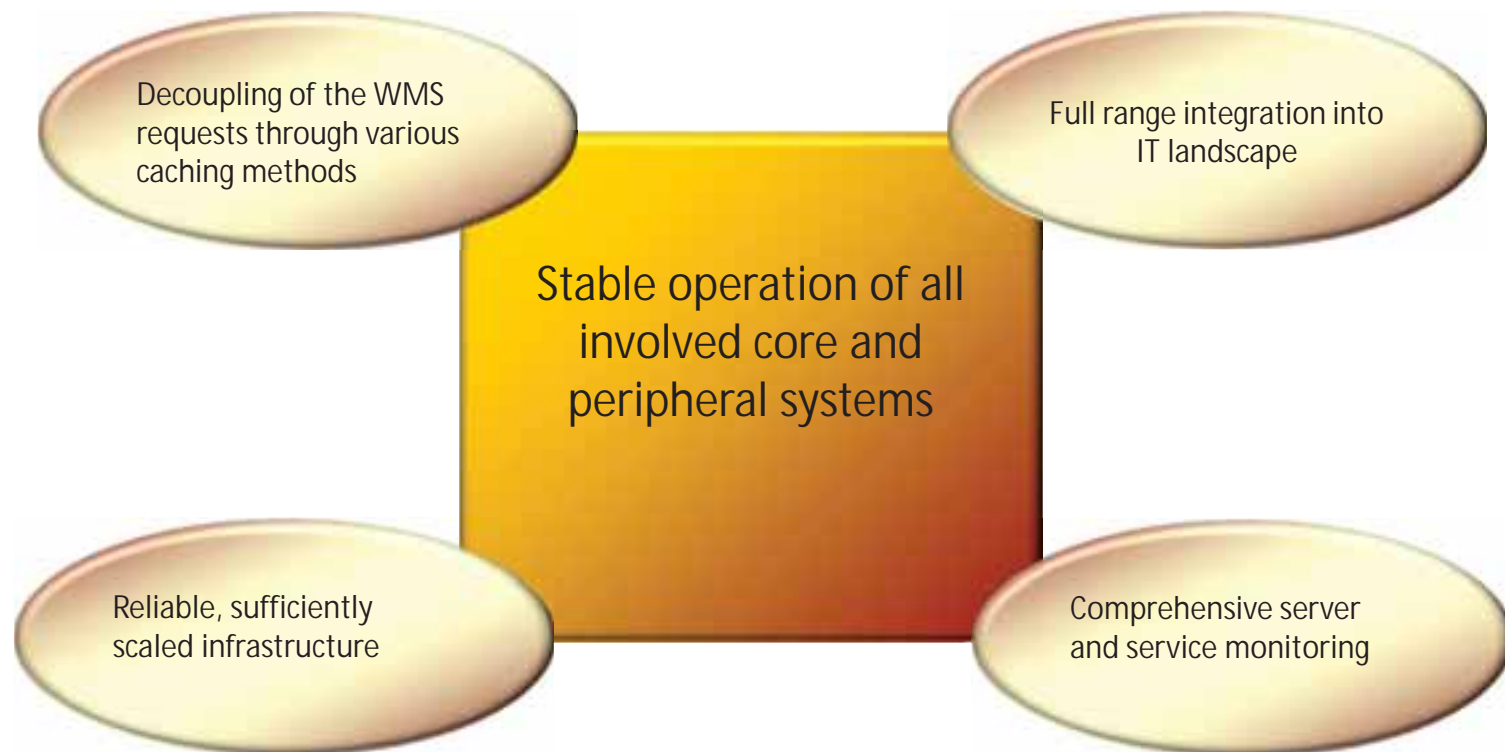- **implement various Decision Support Systems**

IT-Integration and IT-Operations

Challenge / Solution

Decoupling of the WMS requests through various caching methods

Full range integration into IT landscape

Stable operation of all involved core and peripheral systems

Reliable, sufficiently scaled infrastructure
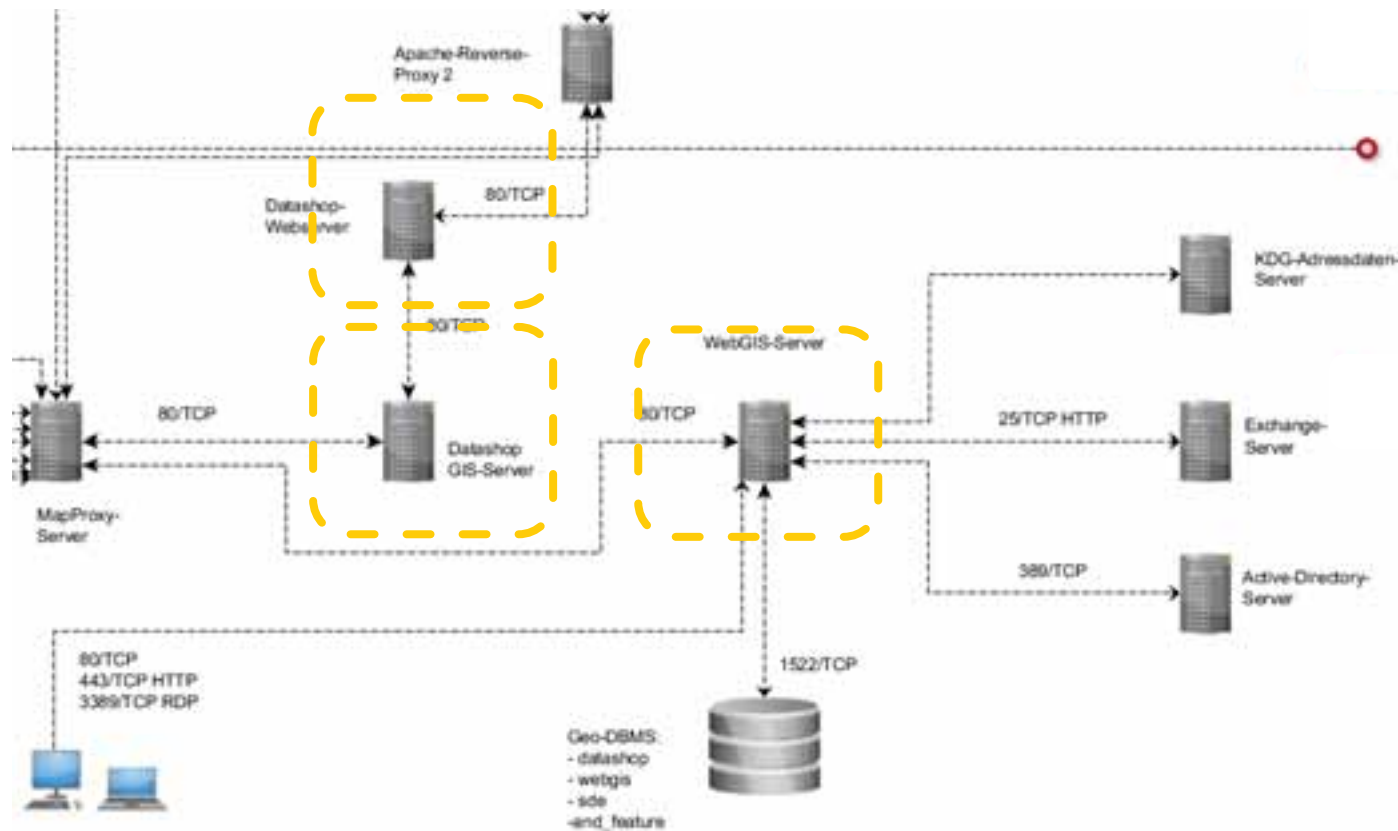
Comprehensive server and service monitoring

IT-Integration and IT-Operations

Reliable, sufficiently scaled infrastructure

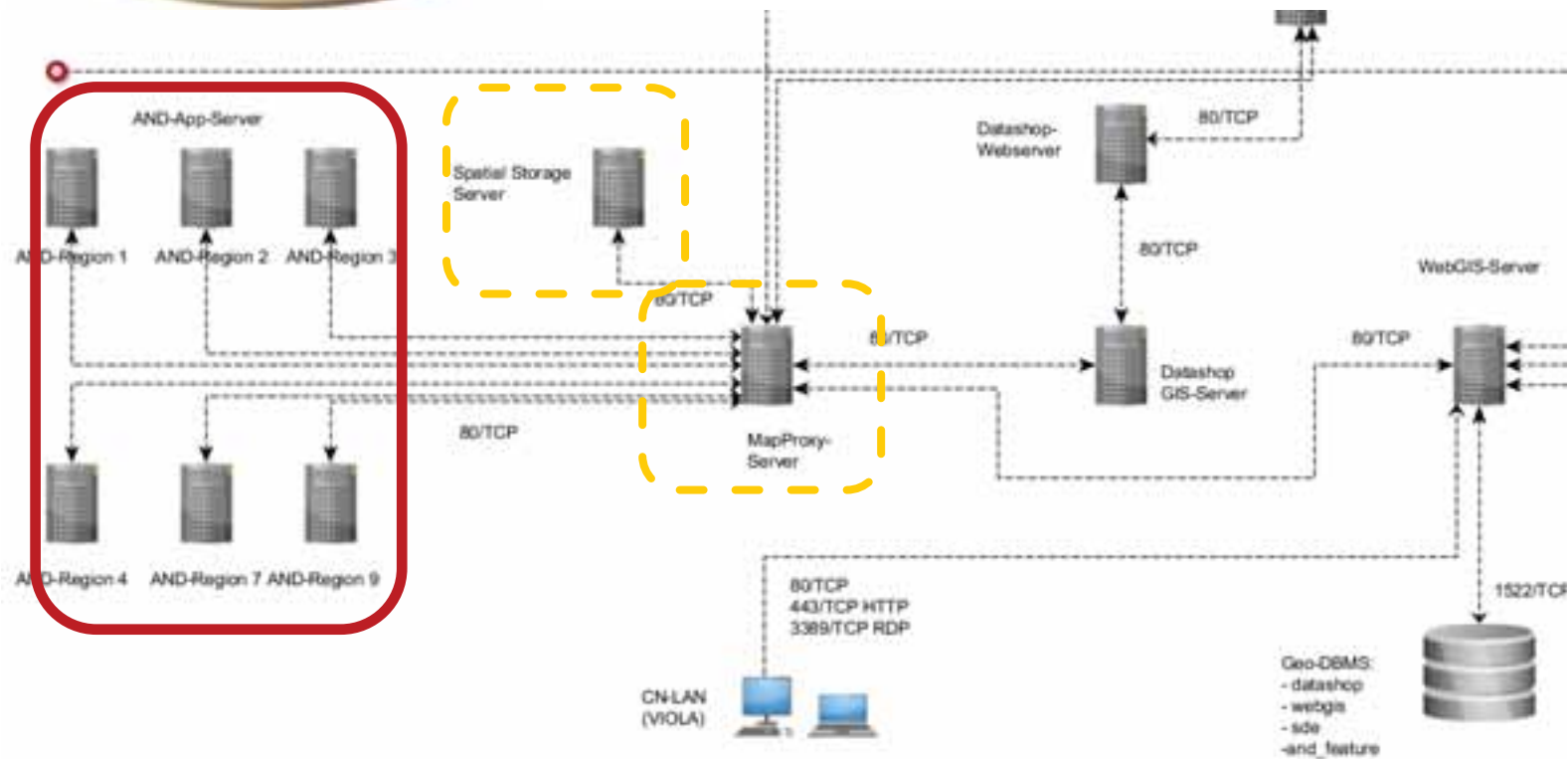core system unbundling, depending on task

advantages during maintenance slots, stability in regular operation

IT-Integration and IT-Operations

Reliable, sufficiently scaled infrastructure

relief of ancillary systems -

side effect reduction, stability in regular operation

IT-Integration and IT-Operations

Comprehensive server and service monitoring

Combination of different tools and methods

-- currently in development--

Basic - Monitoring

Argent Commander

= Server-Monitoring

Oracle GridControl

=DB-Performance-Monitoring

IT-Integration and IT-Operations

Comprehensive server and service monitoring

Combination of different tools and methods

-- currently in development--

Application (– and Service -) Monitoring

JVM – memory usage

Automated Logfile-Analysis (Cronjobs)

WMS-Availability and Response Time
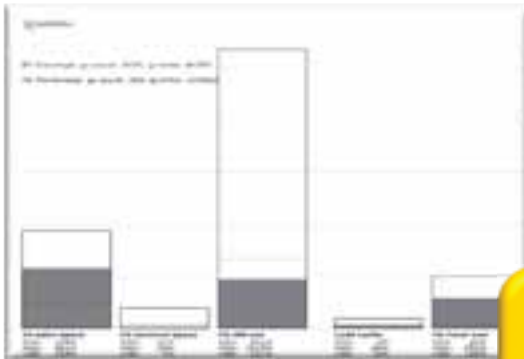
to be continued …

IT-Integration and IT-Operations

Decoupling of the WMS requests through various caching methods

Implementing MapProxy as a core component

Shifting Geodata-Cache to Cache-Repository
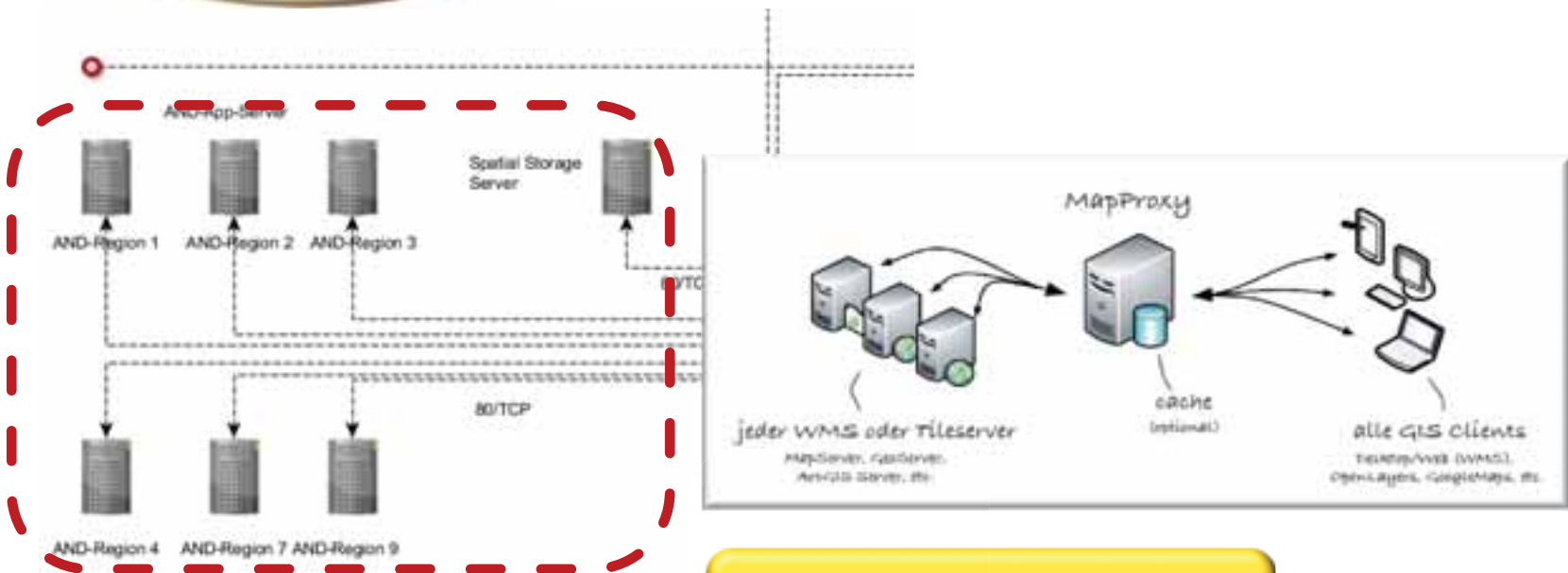
→ Geodata – Caching by MapProxy-Seeding-Processes
→ Performance Booster!

IT-Integration and IT-Operations

Kabel Deutschland

Full range integration into IT landscape

High customer orientation by durably stable business and short design cycles

IT-Basic Operation	Datacenter (Server and DBs)
Trouble-Shooting	Direct Connect to BMC Action Request System Integration in Incident- and Problem-Management
Maintenance Windows – Minor (e.g. Hotfixes):	Change-Management
Major-Release Cycles	Release-Management
Architektur-/Systemerweiterungen	Request-Management Application Planning
	High User Acceptance!
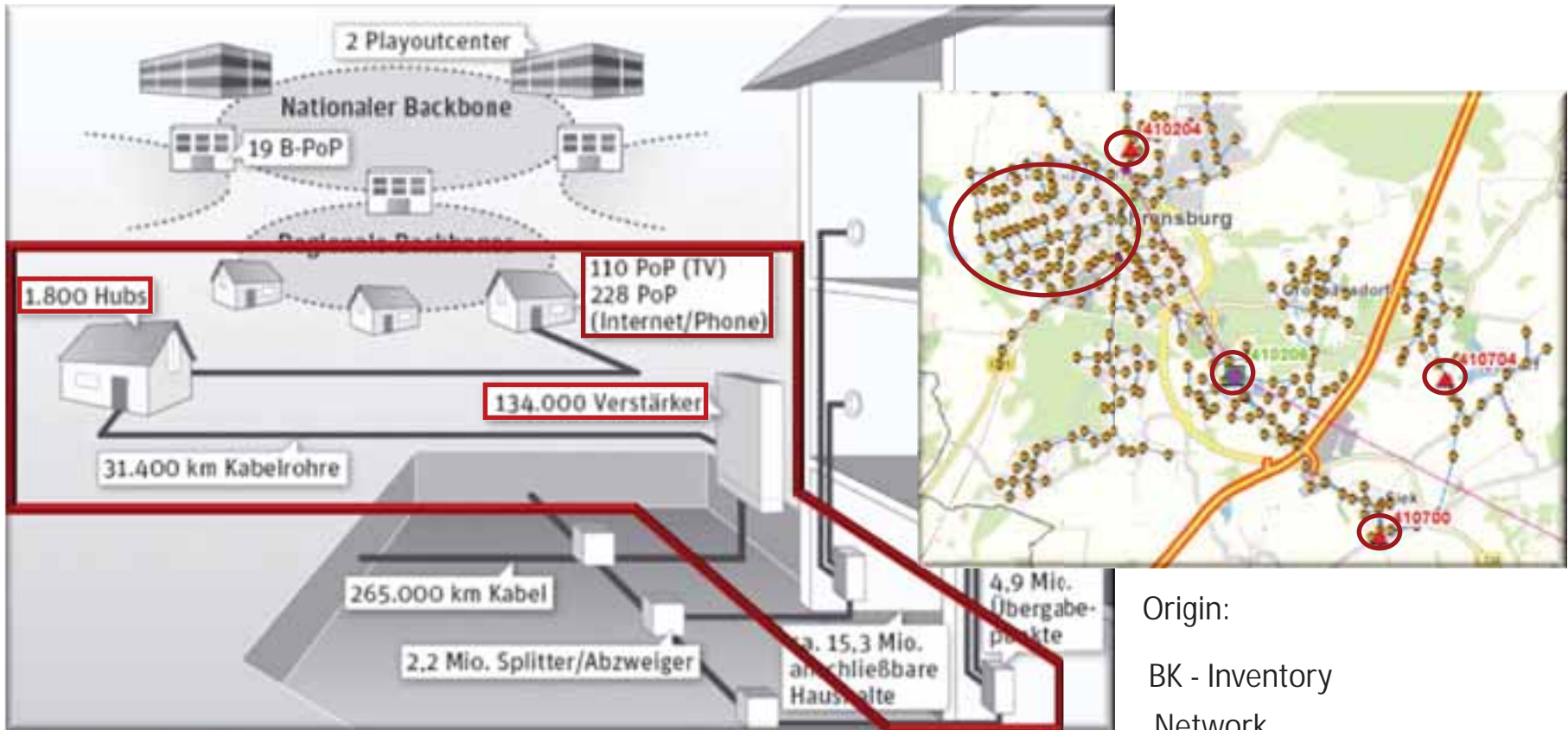
Origin:

BK - Inventory

Network documentation system

Stand: Januar 2012

Kabel Deutschland

2 Playoutcenter

Nationaler Backbone

19 B-PoP

Regionale Backbones

1.800 Hubs

110 PoP (TV)
228 PoP
(Internet/Phone)

134.000 Verstärker

31.400 km Kabelrohre

265.000 km Kabel

2.2 Mio. Splitter/Abzweiger

ca. 15,3 Mio.
anschließbare
Haushalte

ca. 8,7 Mio.
angeschlos
Haushalte

4,9 Mio.
Übergabe-
punkte
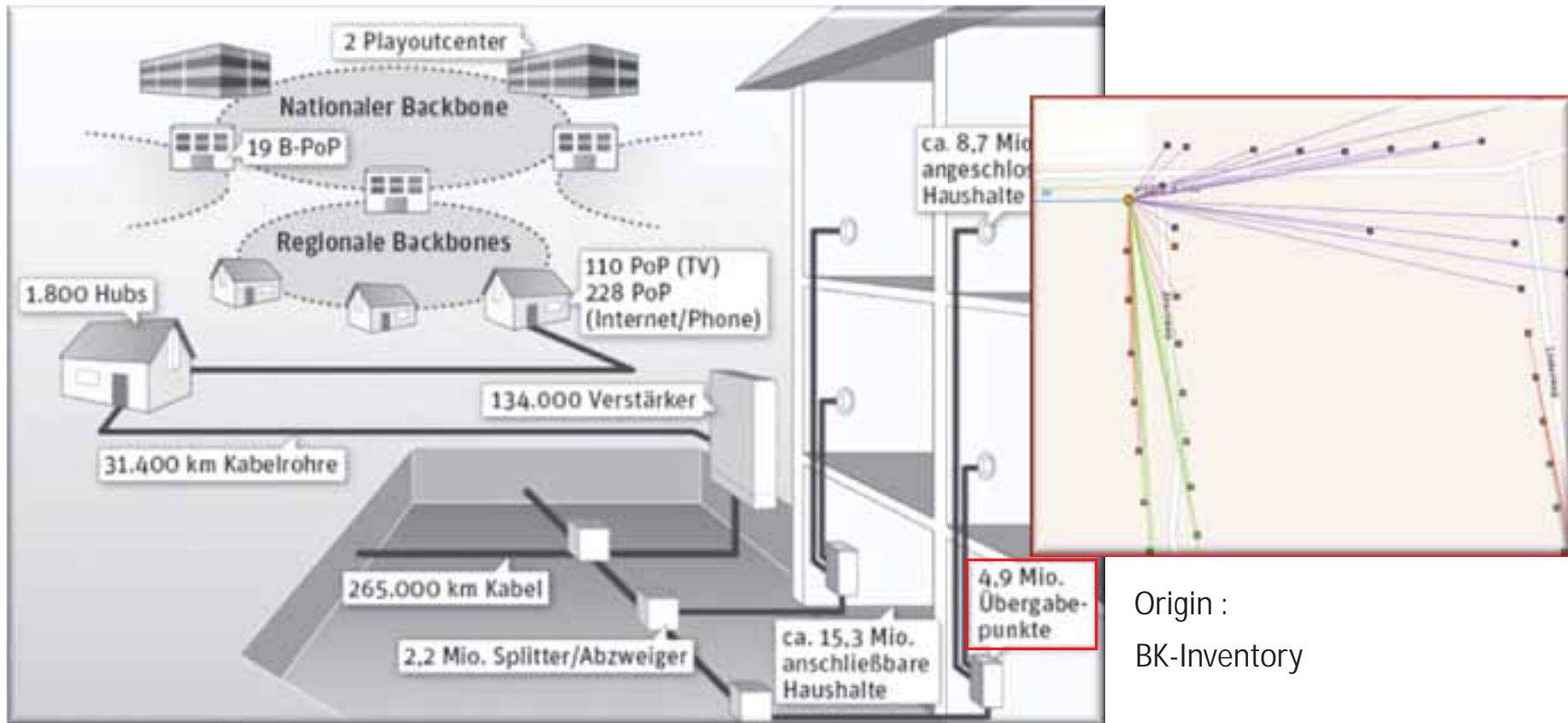
Origin :

BK-Inventory

Stand: Januar 2012

Correlation of Data – a basic example

- How many amplifiers are located in postcode area 22952?
- What are the technical attributes?

Since amplifier points are preferably located on street corners, they have no postal address and therefore no postal code. In GIS, however, such connections can be represented very easily.
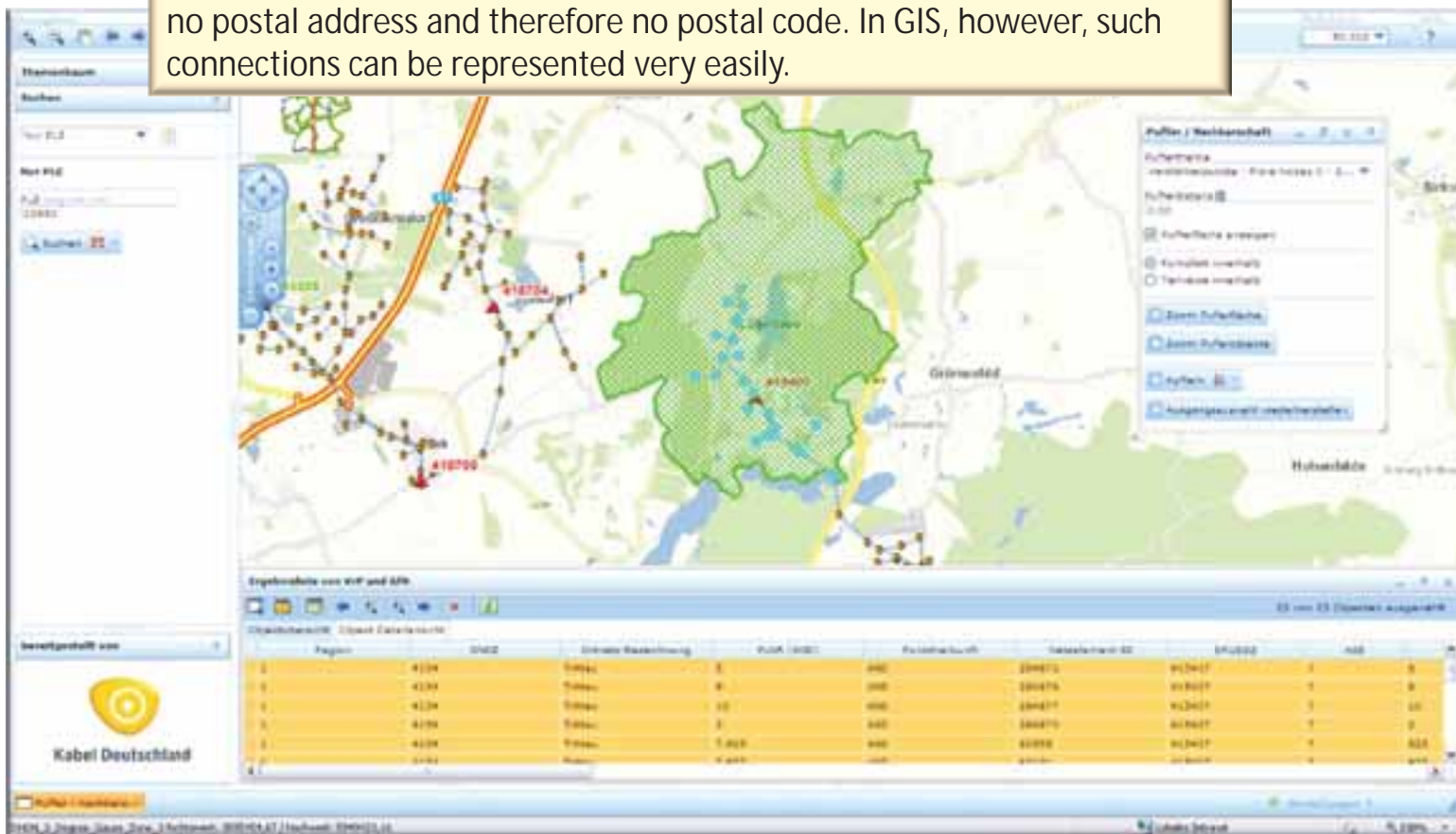
Data Correlation - Example I

Segmentation planning

Network-Segmentation: We cut our network in smaller pieces (segments or cluster)

Effect: The same bandwidth can be allocated to fewer households

Segmentation is demand-driven due to network load

Network Load is monitored by KPIs: One of them is the so-called „Mean Utilization"

For the following analysis, Data from three different sources were correlated:

A. „Realtime Performance Monitoring System"
B. „Network Planning & Build - Reporting Platform"
C. „BK-Inventory"

The graphical aspect gained through WebGIS leads to the most reasonable planning-alternative

Data Correlation - Example I

Segmentation planning

Theme-Layer „Segmente": weekly updated
report based on „KDG Network Capacity Reporting"

Data Correlation - Example I

Segmentation planning

Data-Origin: CMTS-Data

Provided by a set of DataCollection Server

Data comparison with BK-Inventory

Network Capacity Report
KW 19/2012

Data Correlation - Example I

Segmentation planning

Search for „Segmentauslastung"
delivers the use to capacity segments in the target area

Data Correlation - Example I

Segmentation planning

Search for „Segmentauslastung" delivers the use to capacity segments in the target area

Determine the root-network-element via data input of characteristic attributes: GRUSSZ, ASB, or visually

Use Object identifier to find "Homes passed"
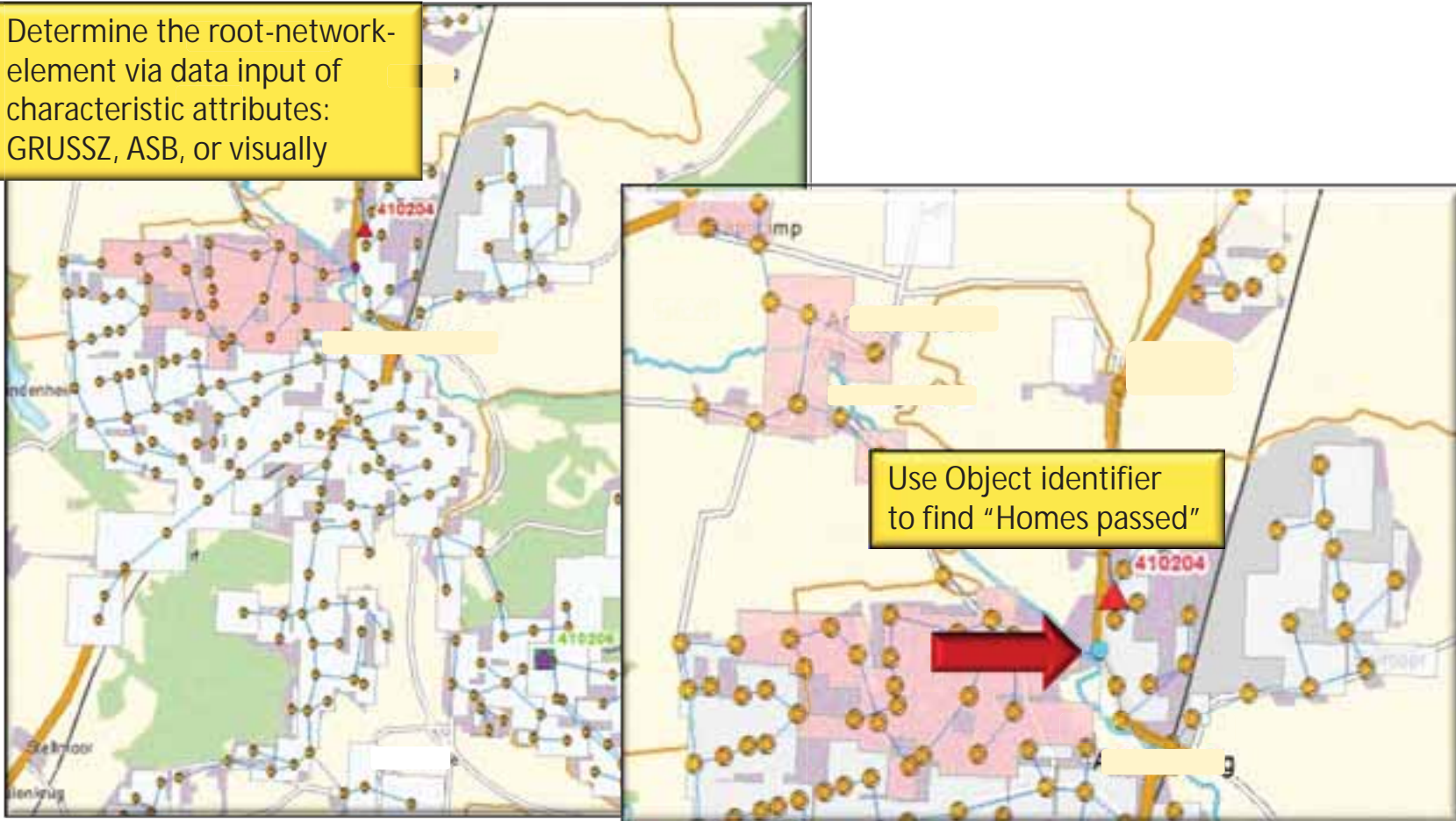
Data Correlation - Example I

Kabel Deutschland

Segmentation planning

Result: the segment has 1.878 Homes passed!
Next step: examination, at which of the selected amplifiers only half of the homes passed reside

Determine a fibre continuation

Data Correlation - Example II

Flood in Germany 2013 ⟶ Support
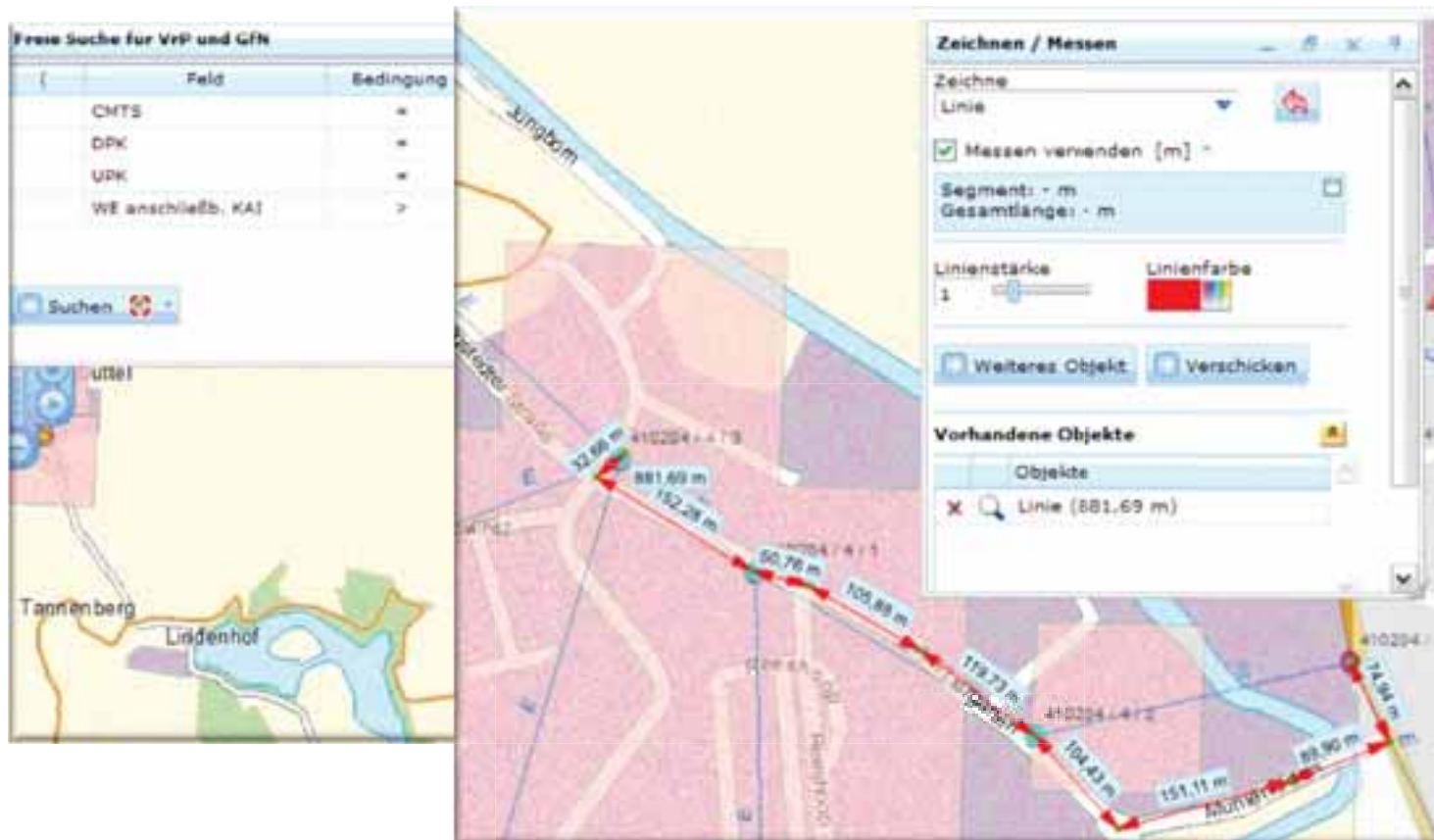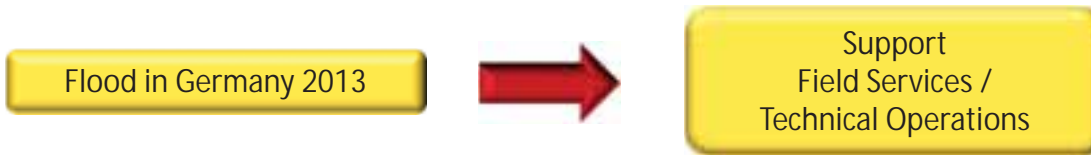Field Services /
Technical Operations

Summer 2013: Installation of a „Flood-Response-Team" to support and control the field service technicians

Establishing a Decision Support System based on WebGIS, as a central component to localize + repair damaged network elements

Embedding the WMS „Extremhochwasser Sachsen" as a statistic number provided a first management report

Detection of the flood-areas actually affected by provision of third party data
Data collection in WebGIS (Editing Function)

Determining all amplifiers and signal points in the flood area as a result of spatial analysis in Web GIS

Example II: Flood in Germany 2013

Kabel Deutschland
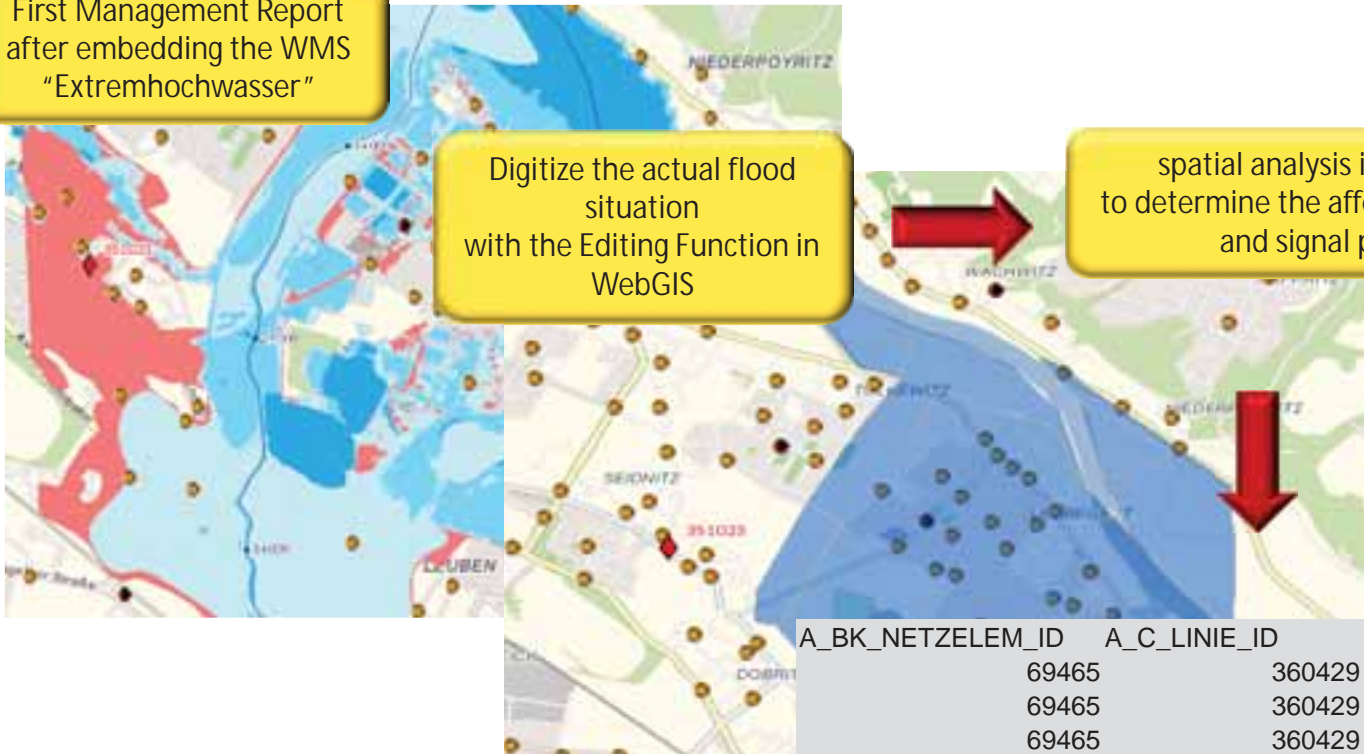
Flood in Germany 2013 → Support
Field Services /
Technical Operations

First Management Report
after embedding the WMS
"Extremhochwasser"

Digitize the actual flood
situation
with the Editing Function in
WebGIS

→ spatial analysis in Web GIS
to determine the affected amplifier
and signal points

A_BK_NETZELEM_ID	A_C_LINIE_ID	A_DOCSIS_STANDARD
69465	360429	3.0
69465	360429	3.0
69465	360429	3.0
69465	360429	3.0

Data Correlation - Example III

**Support
Sales and Distribution**

Providing aggregated Network Data as 250m Raster-Objects

Representation of the current state of development

Planned completion date according to the actual state of the individual planning-project

Data Aggregation for other objects like federal/administrative borders also available

Conclusion and Forecast

The easy to access and continually evolving spatial analysis capability of geographic data provided by WebGIS, has admittedly filled a void in the landscape of KDG network planning tools.

The correlation of data about the geography is a time and resource-saving method of information provision. It saves costly joins to database fields or calculations.

The application will constantly being expanded and activated for even more users.
Next topics:

-- Data - embedding and analysing for third-party divisions
-- Provide smart algorithms for automated / semi-automated segmentation planning
-- enable write-access for connected data-sources

Thank you very much! Any questions?

Kabel Deutschland