PTV RoadEditor

May 09, PTV AG

traffic mobility logistics.

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Terminology
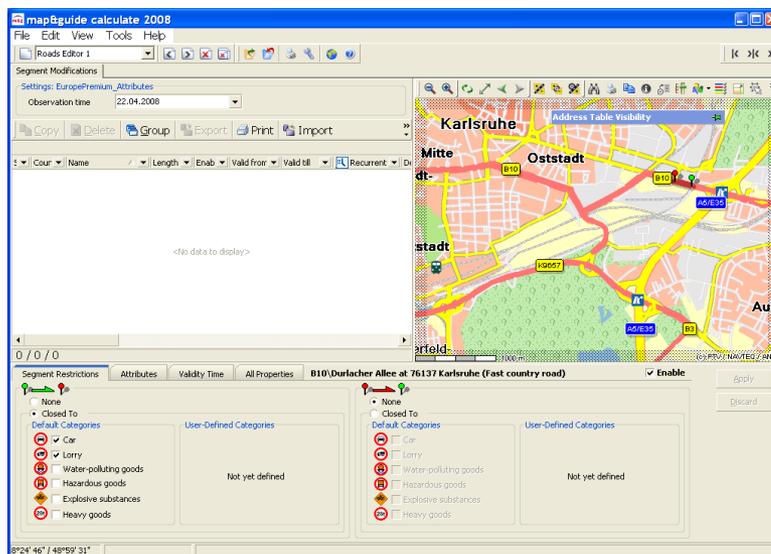
> What is the RoadEditor ?

> M&G 2009

> Business case "road editor"

> Operator workstation

> RoadEditor workstation

> Not xRoute itself

> Not integrated as administration frontend in xRoute

> BUT:

> xRoute is able to deal with RoadEditor layer data (binary files & databases)

Features
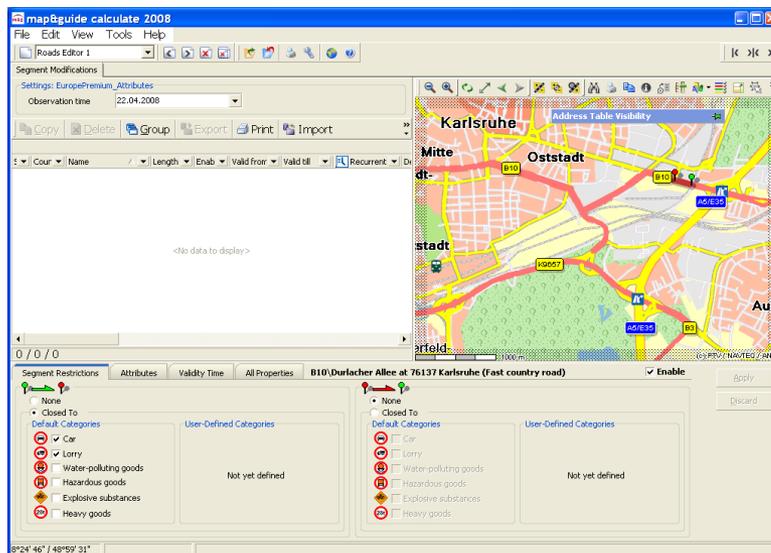
> Editing and adding of segment attributes (streets and ferries)

>> Road blockings (e.g. blocked for trucks)

>> Conditional blockings (maximum headroom for tunnels and capacity for bridges)

>> Bonus/malus (preferred routes, "green" routes)

>> Time dependent blockings

>> Maintenance of additional text labels

Features

Features – routing relevant attributes
affect routing geometry

SegmentLength	Segment length	Existing attribute
FerryLength	Ferry travel time	Existing attribute
IsRamp	Ramp flag	Existing attribute
BlocksPKW	Blocked for cars	Existing attribute
...	...	
MaxHeight	Conditional blocking	Additional attribute
MaxWeight	Conditional blocking	Additional attribute
MaxWidth	Conditional blocking	Additional attribute
...	...	
HazardousToWaters	Blocking	Additional attribute (Truck)
HazardousGoods	Blocking	Additional attribute (Truck)
Combustibles	Blocking	Additional attribute (Truck)
...	...	
OptBlocks1-10	Blocking	Additional attribute (Project, z.B. ADAC)
OptMalus1-10	Malus/Bonus	Additional attribute (Project, z.B. ADAC)
...	...	

Features – routing relevant attributes
affect routing geometry

SegmentLength	Segment length	Existing attribute
FerryLength	Ferry travel time	Existing attribute
IsRamp	Ramp flag	Existing attribute
BlocksPKW	Blocked for cars	Existing attribute
...	...	
MaxHeight	**Conditional blocking**	**Additional attribute**
MaxWeight	**Conditional blocking**	**Additional attribute**
MaxWidth	**Conditional blocking**	**Additional attribute**
...	**...**	
HazardousToWaters	**Blocking**	**Additional attribute (Truck)**
HazardousGoods	**Blocking**	**Additional attribute (Truck)**
Combustibles	**Blocking**	**Additional attribute (Truck)**
...	...	
OptBlocks1-10	Blocking	Additional attribute (Project, z.B. ADAC)
OptMalus1-10	Malus/Bonus	Additional attribute (Project, z.B. ADAC)
...	...	

Features – routing relevant attributes
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SegmentLength	Segment length	Existing attribute
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...	...	
MaxHeight	Conditional blocking	Additional attribute
MaxWeight	Conditional blocking	Additional attribute
MaxWidth	Conditional blocking	Additional attribute
...	...	
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Combustibles	Blocking	Additional attribute (Truck)
...	...	
OptBlocks1-10	**Blocking**	**Additional attribute (Project, z.B. ADAC)**
OptMalus1-10	**Malus/Bonus**	**Additional attribute (Project, z.B. ADAC)**
...	...	

Features – not routing relevant attributes
do not affect routing geometry

> Additional text labels

Fields of application

> TruckAttributes (predefined RE layer) in M&G 2009

> Businesscase "roadeditor" in M&G 2009

> ADAC Tour Office Intranet (TOI)

> ADAC Internet Touren Planer (ITP)

> xRoute 1.8

Standard routing application

Client application

Routing-Engine

| Linker | Router | Lister |

GeoAccess

Routingdata   Renderdata

Standard routing application with binary RE-Layer

Client application

Routing-Engine

| Linker | Router | Lister |

LayerAccess

GeoAccess

Routingdata   Renderdata   LayerData
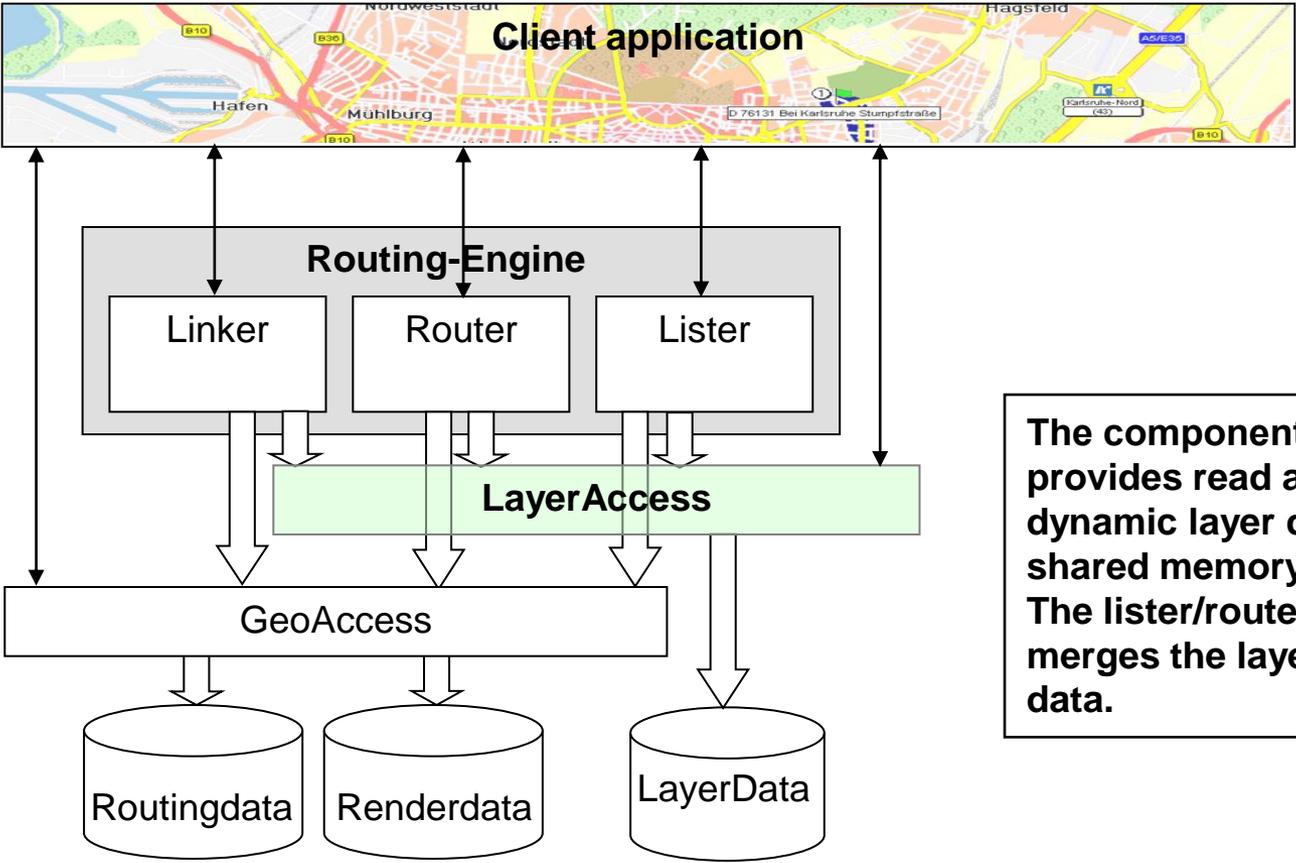
The component „layer access"
provides read access to the
dynamic layer data (stored in a
shared memory folder).
The lister/router/linker component
merges the layer data with the map
data.

Standard routing application with binary RE-Layer

Standard routing application with binary RE-Layer

Client application

Routing-Engine

Linker | Router | Lister

LayerAccess
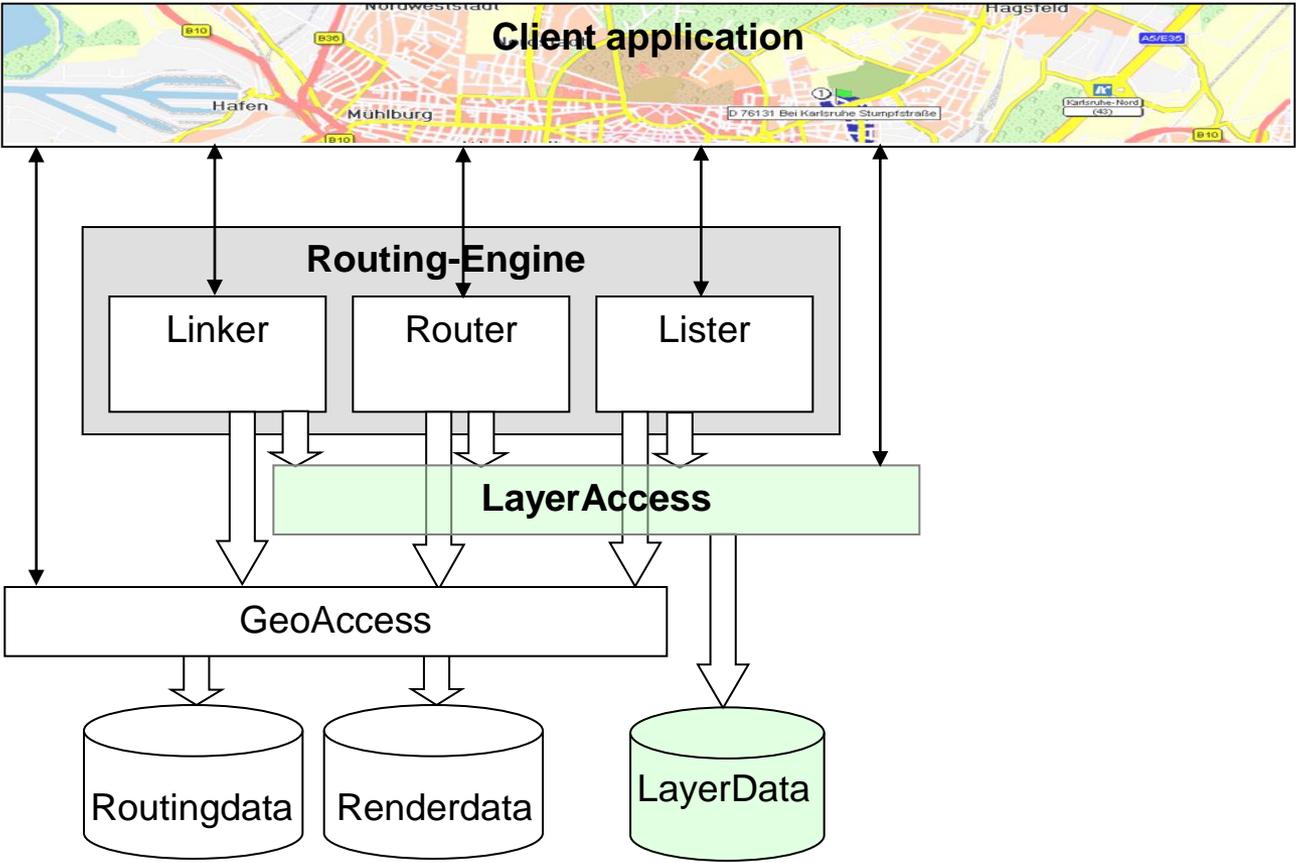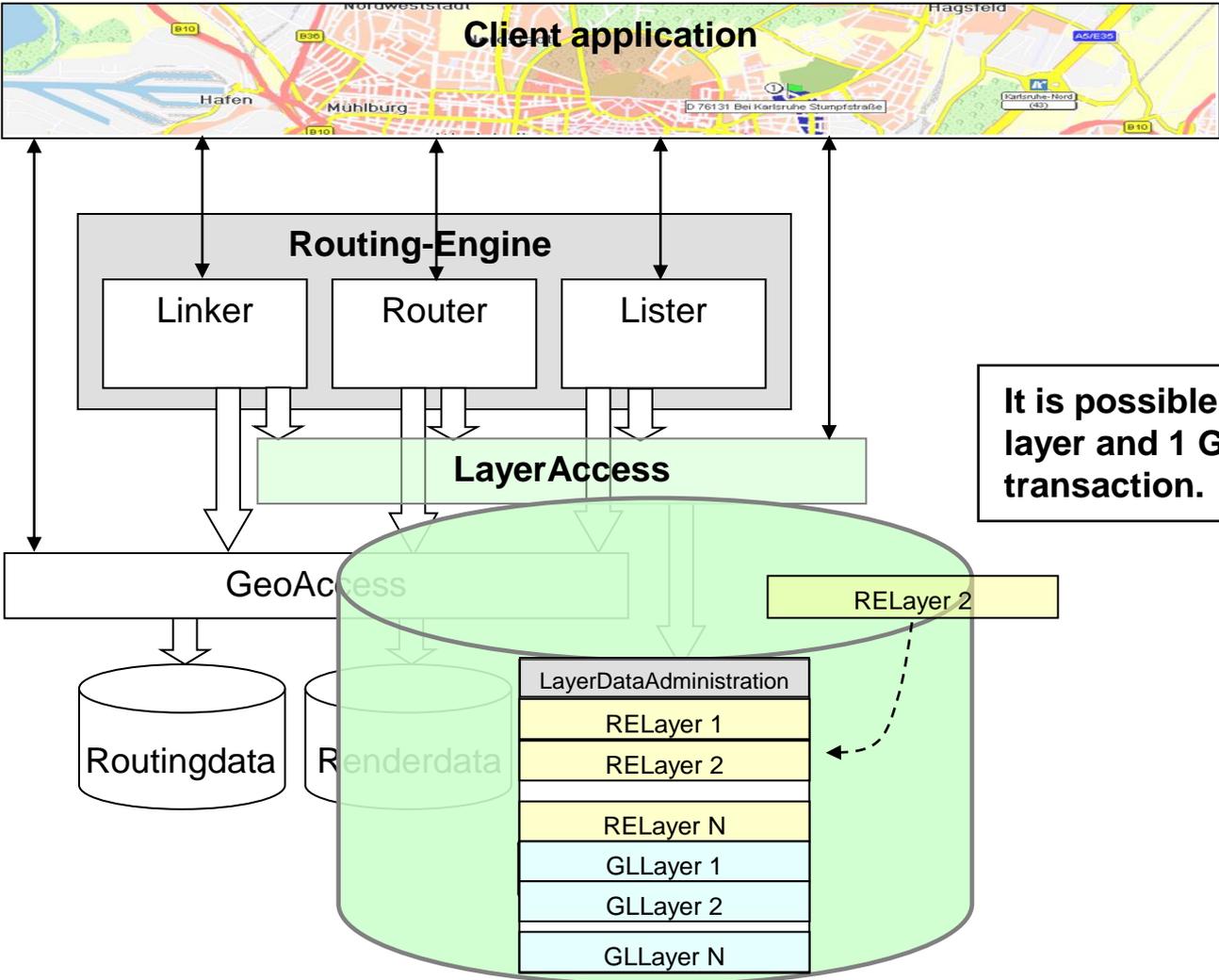
It is possible to request up to 1 RE layer and 1 GL layer within one transaction.

GeoAccess

RELayer 2

Routingdata | Renderdata

LayerDataAdministration
RELayer 1
RELayer 2
RELayer N
GLLayer 1
GLLayer 2
GLLayer N

Standard routing application with binary RE-Layer
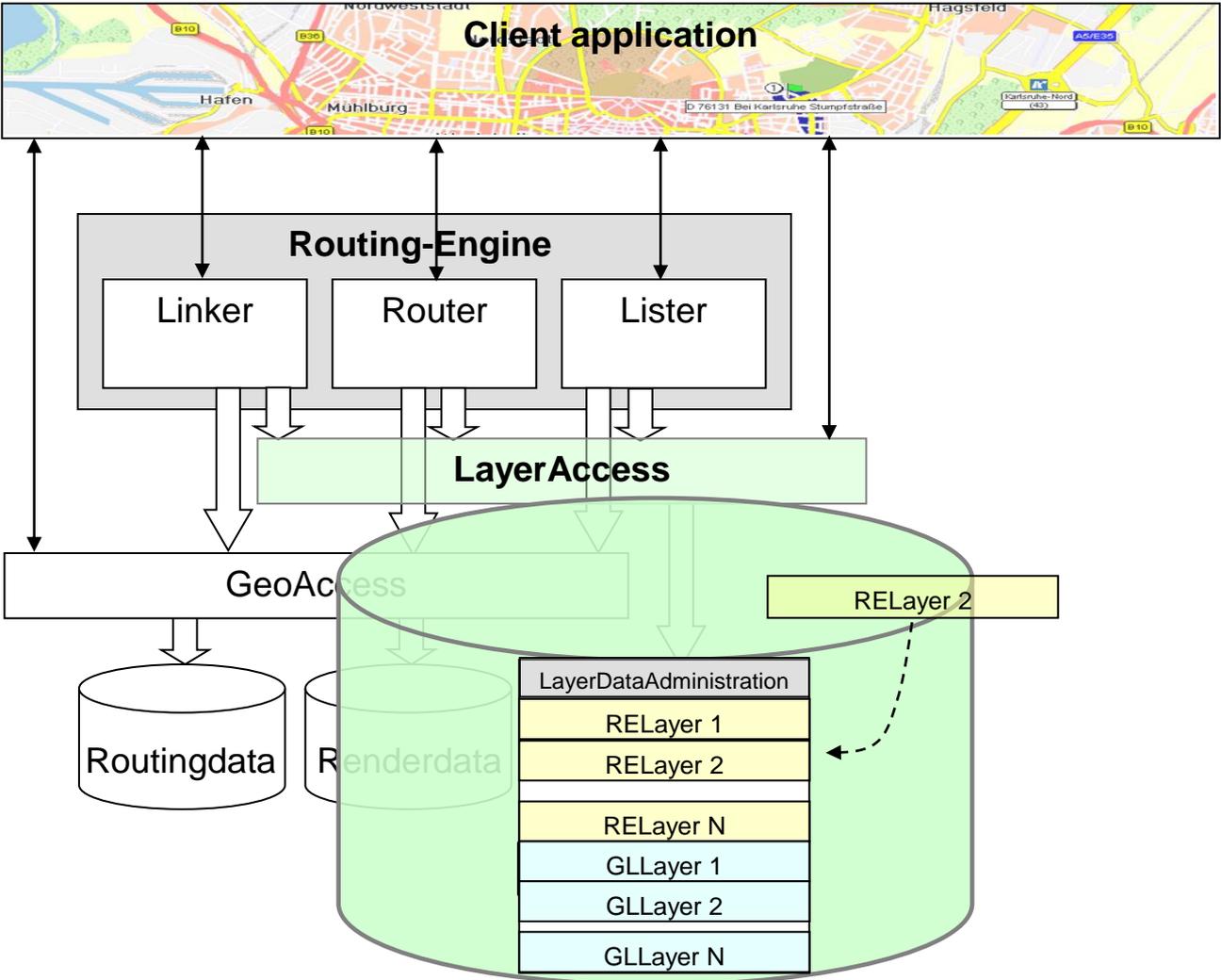
Standard routing application with binary RE-Layer
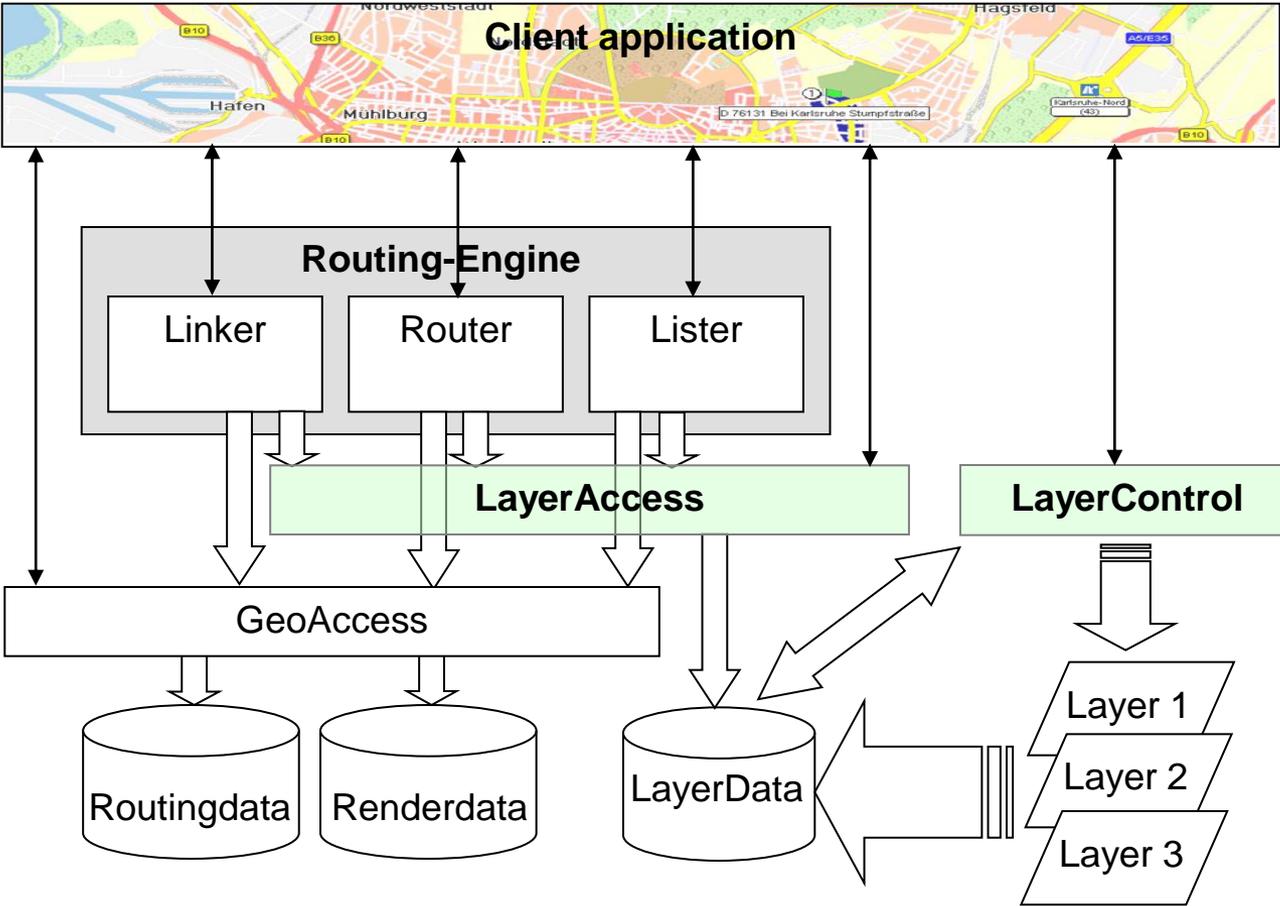
The component layer control creates a new shared memory file whenever the xRoute is started.

If a specific binary layer is requested the data is cached within the shared memory file.

Standard routing application with binary RE-Layer
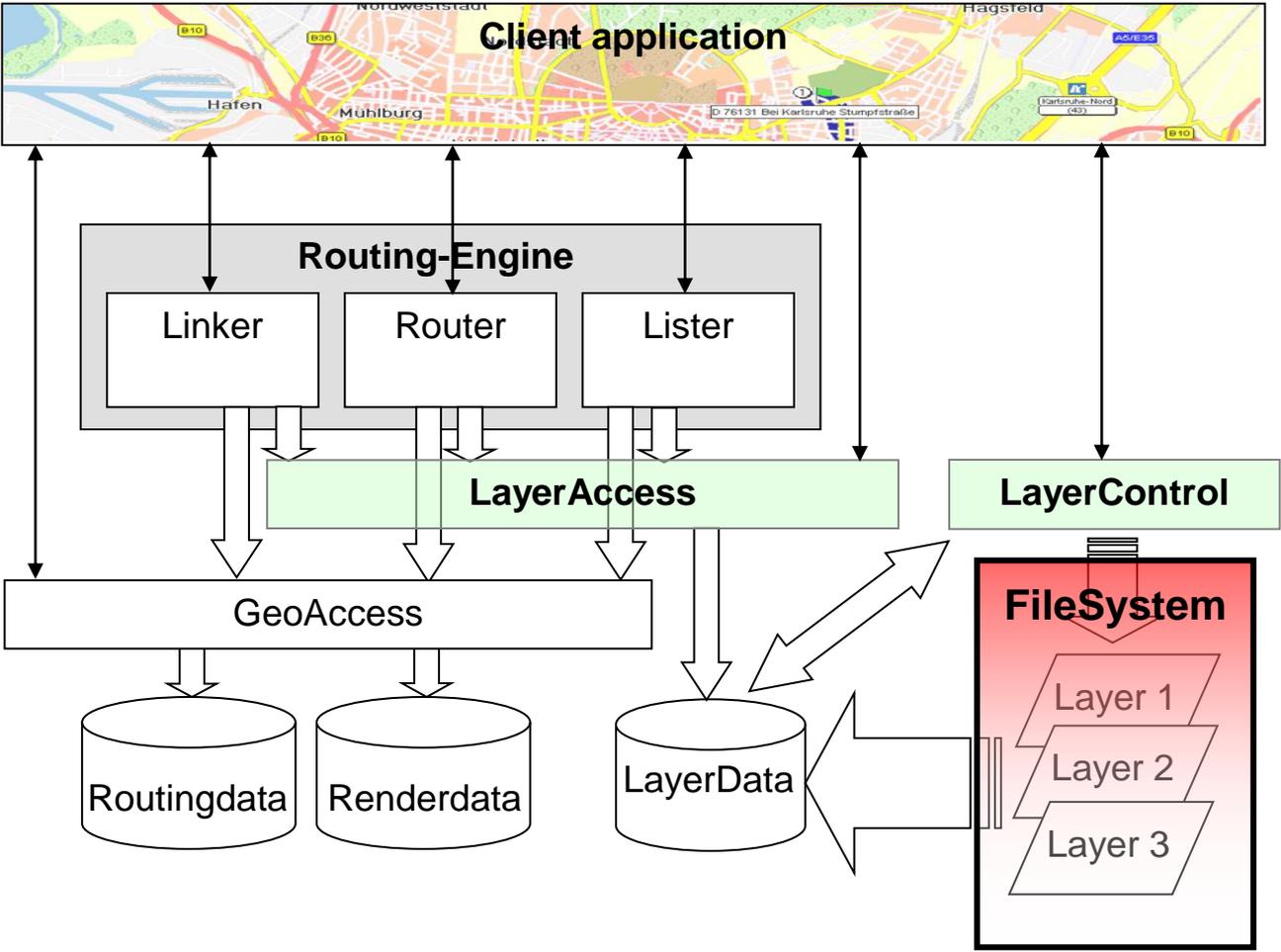
Standard routing application with binary RE-Layer

Standard routing application with binary RE-Layer

Client application

Routing-Engine
- Linker
- Router
- Lister

LayerAccess

LayerControl

The binary layer files can be provided from remote via FTP or manually.

GeoAccess

Routingdata Renderdata LayerData

FileSystem
- Layer 1
- Layer 2
- Layer 3

-FTP
-manually
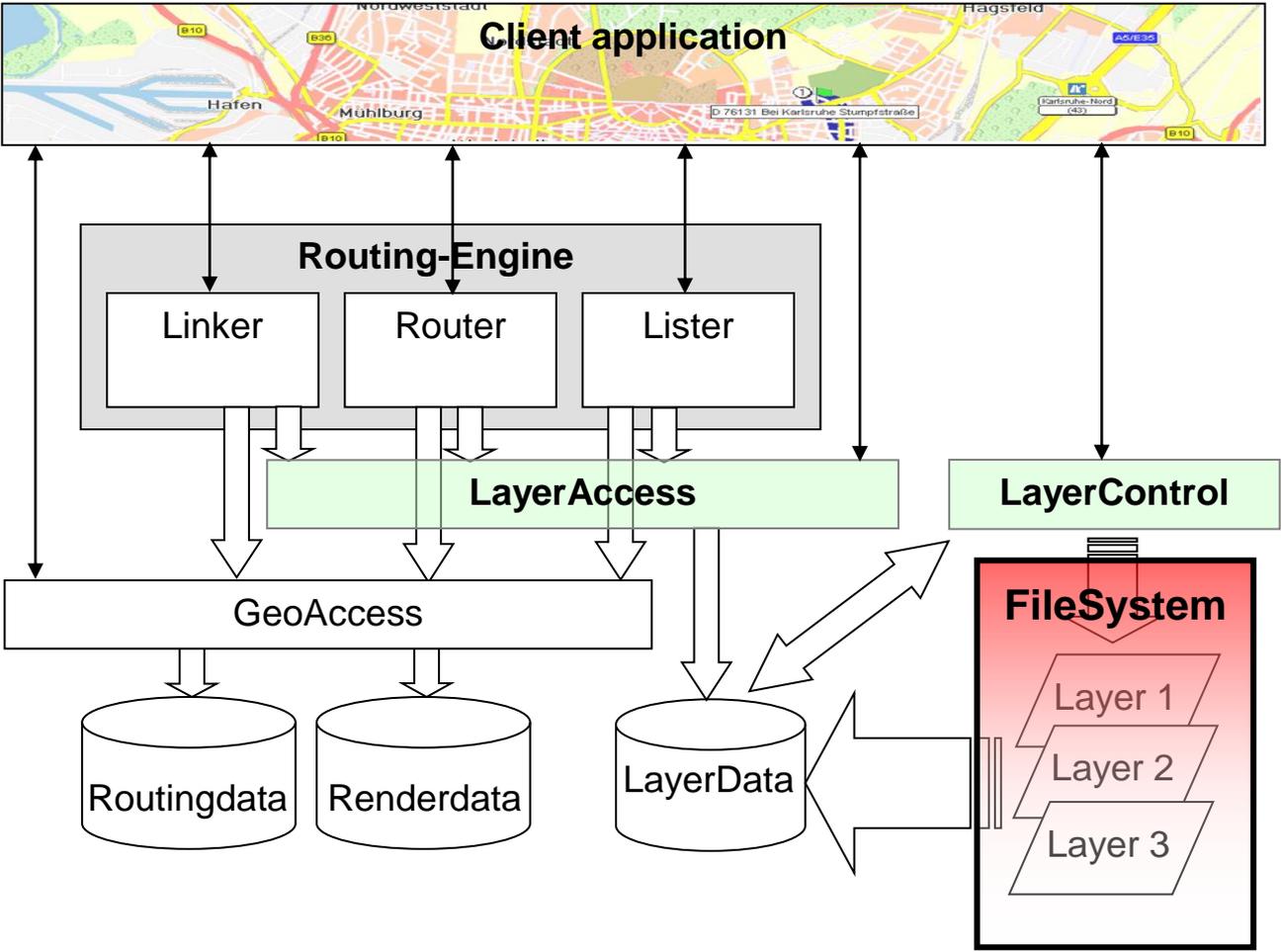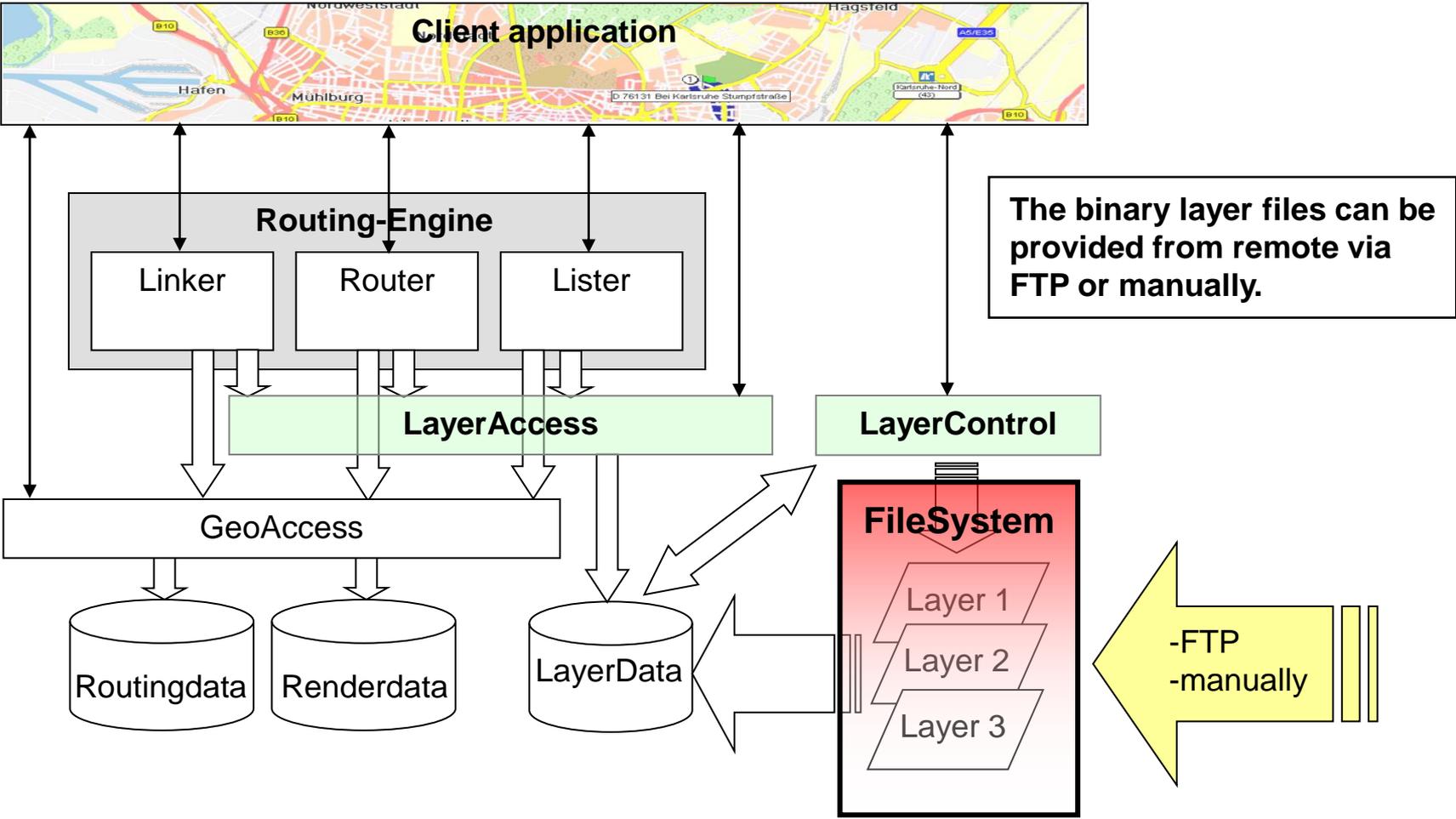
Standard routing application with binary RE-Layer
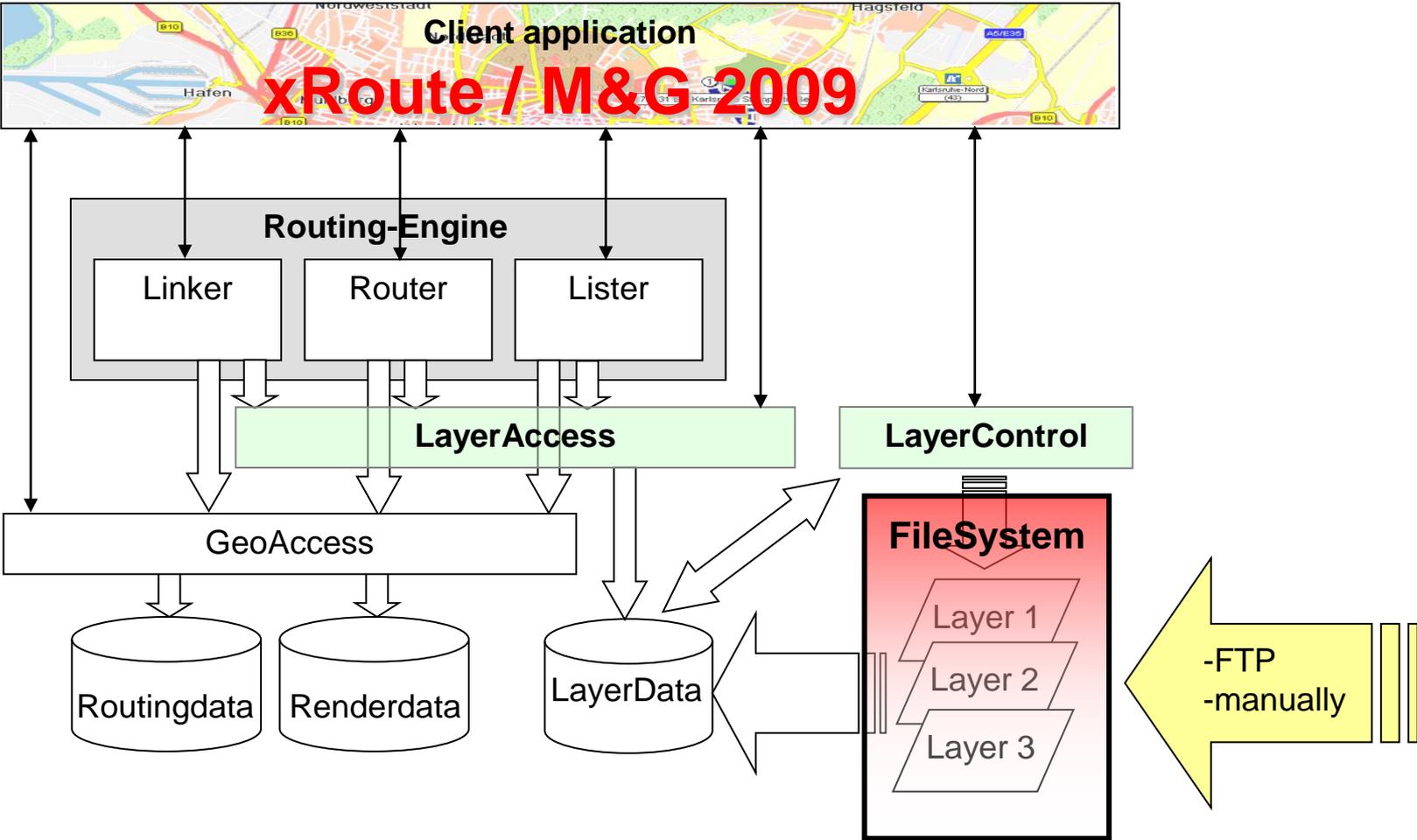
RE desktop application

The component LayerGenerator is used to export layer data from M&G desktop into binary layer files

M&G 2009 RE Arbeitsplatz

LayerGenerator

Rendering-Engine

Net Access-

FileSystem

Layer 1

Layer 2

Layer 3

Layerexport

GeoAccess

RE-DB Access SQL-Server

Renderdata

Routingdata
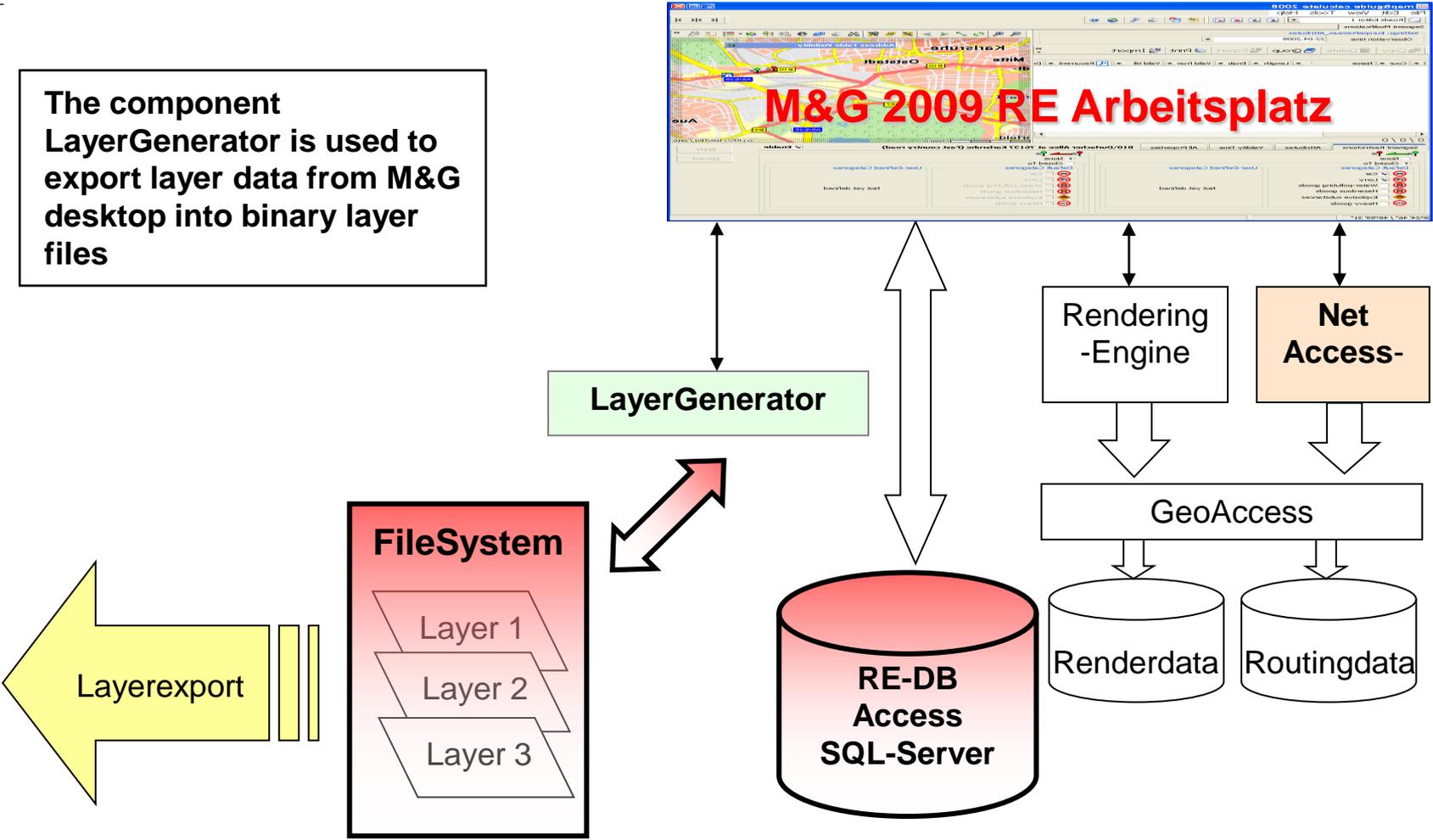
Architecture – M&G 2009
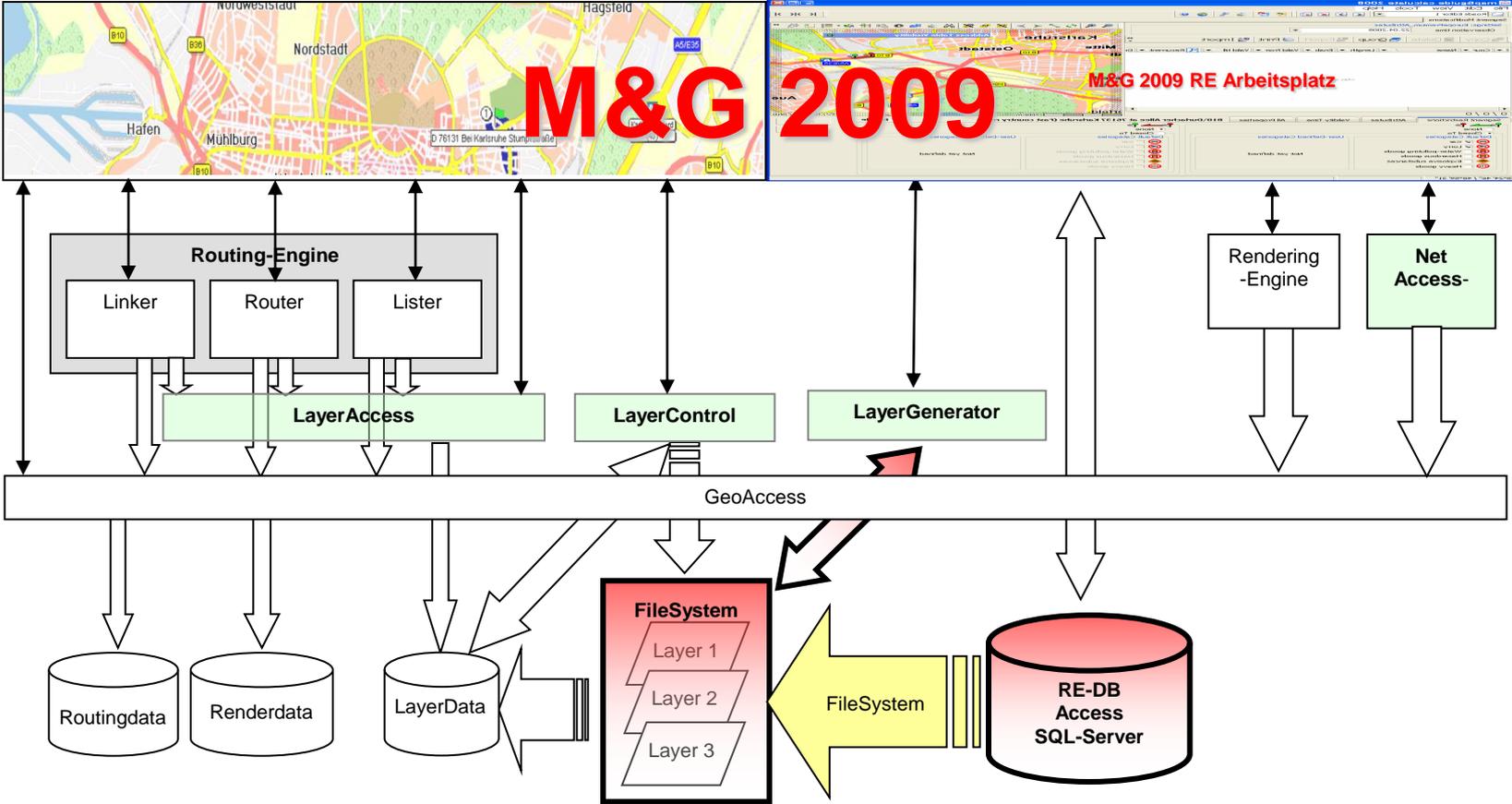
Component overview

> LayerGenerator :
  → exports binary layer files based on map&guide businesscase RoadEditor
  → considers observation time and validity periods

> LayerControl : produces shared memory files based on binary layer files

> LayerAccess : provides access to the shared memory files

Weak coupling: RE desktop / xRoute
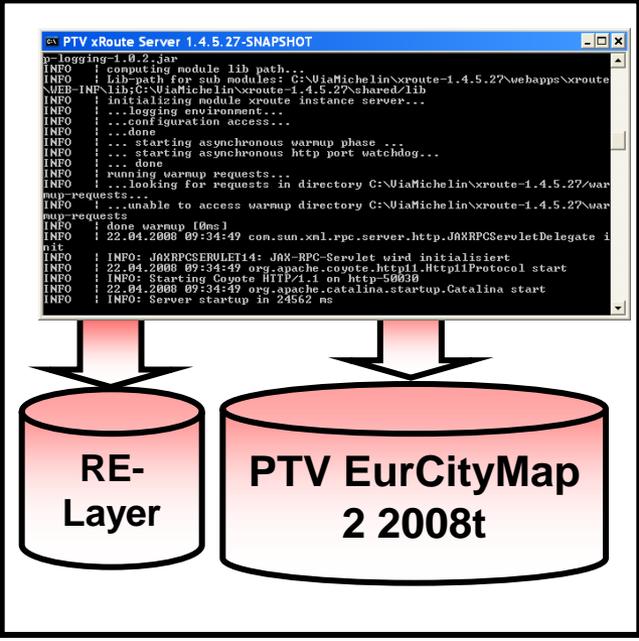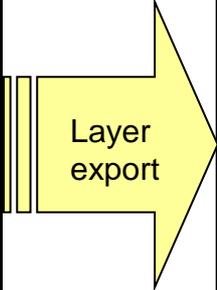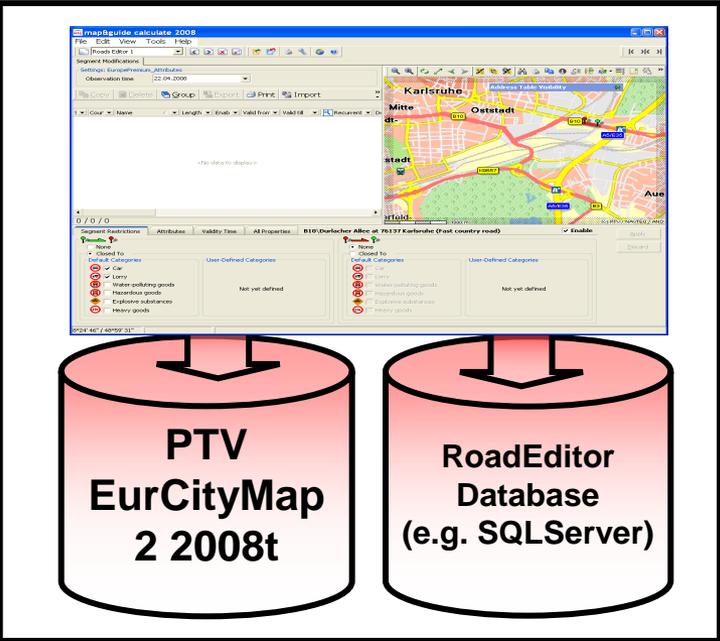
Strong coupling: RE desktop / xRoute (e.g. ADAC)

PTV EurCityMap 2 2008t

read/write

Read only

RE-Layer

PTV EurCityMap 2 2008t
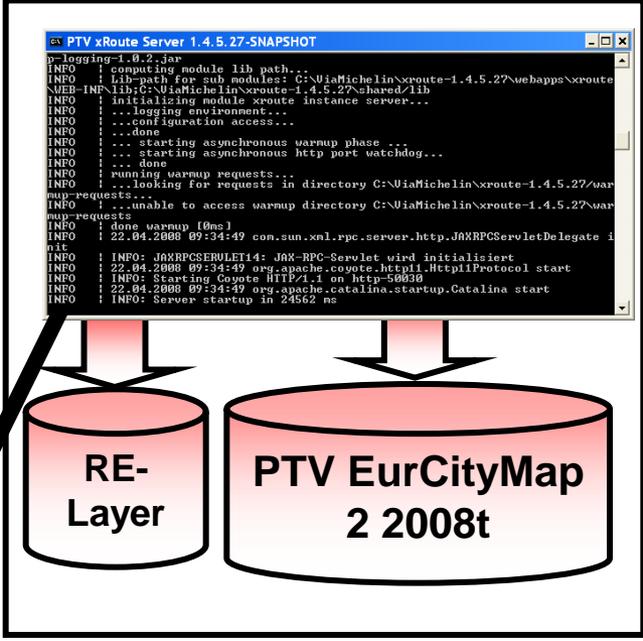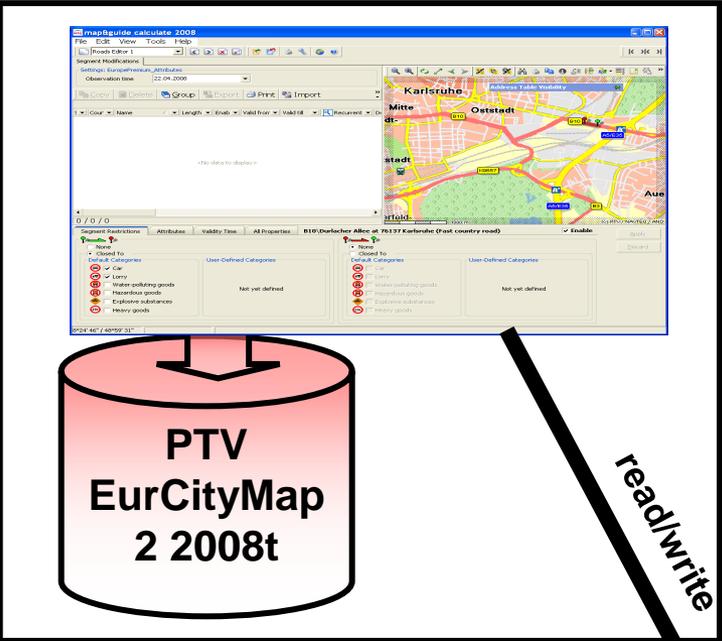
The component LayerControl triggers LayerGenerator to export the database content into a binary file „on the fly".

RoadEditor Database (e.g. SQLServer)
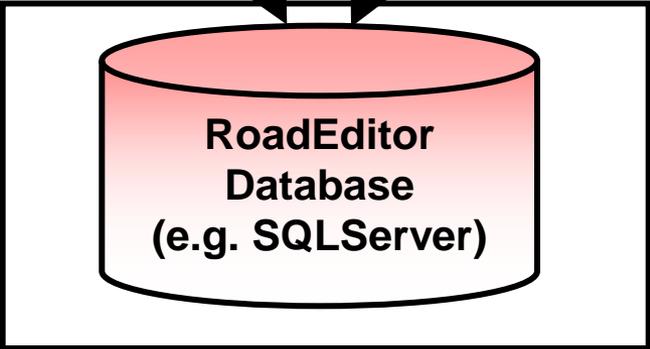
xRoute WINDOWS!

Differentiation

> **What kind of data is stored within a binary layer and in the RE-database?**
  - → Attributes relevant for routing
  - → Flags for definition of additional RE infos
  - → According to the "*observation time*" and "*validity periods*"

> **What kind of information is stored *exclusively* in the RE-database ?**
  - → Attributes not relevant for routing: texts / additional RE infos
  - → Validity periods

> **Limitations per layer:**
  - → quantity: Up to 500 000 edited objects

Demo - road editor database

> Xroute.properties:

```
# roadeditor properties
# switches the RoadEditor routing initialization on or off
roadEditorParameter.enableRoadEditor=true
#
# defines the layerSize for RE layers
roadEditorParameter.normLayerSize=10000000
#
# defines the number of GL layers to allocate
roadEditorParameter.normLayerMaxCount=5
#
# defines the update check intervall in seconds
roadEditorParameter.updateCheckIntervall=120
#
# defines the prefix of the binary RE layer files
roadEditorParameter.preFile=
#
# defines the extension of the binary RE layer files
roadEditorParameter.fileExtension=bin
#
# defines the path where the current RE-layer files will be located
#roadEditorParameter.currPath=
#
# defines the DBConnection String
# ATTENTION: The path to the Database must be given as absolute path
roadEditorParameter.reDBConnection = Provider=Microsoft.Jet.OLEDB.4.0;data
source="C:/Programme/map&guide-professional-2009/maps/EuropeCityMapPremium-3a-2008t-
NQ/EuropePremium.geo/RoadEditor.mdb"
```

Demo - road editor database

> Xroute-truckfast.properties (or within request):

```
#------------------------------------------------------
# roadEditor Properties
#------------------------------------------------------
#
# the name of the roadeditor layer which has to be used
# in route calculation
routingParameter.roadEditorLayer=EuropePremium_Attributes.db

# switches routing with respect to a certain roadeditor layer on or off
#
routingParameter.enableRoadEditor=true

# the starting time for the roadEditor
# legal values are
# NOW, or the time described as a string using the TimeInstant syntax
# Example: 1999-05-31T13:20:00-05:00
routingParameter.startTimeRoadEditor=NOW




or with binary layer named OwnAttributes_0:

routingParameter.roadEditorLayer=OwnAttributes_0
```

Taken from the RoadEditor.mdb table „attributeset"

„.db" indicates database access

Demo - road editor database

> XML request : RoutingParameter

ENABLE_ROADEDITOR=true

START_TIME_ROADEDITOR=2009-05-31T13:20:00-05:00

ROADEDITOR_LAYERNAME=EuropePremium_Attributes.db

ROADEDITOR_ADDITIONAL_OPTIONS : BLOCKS_TRUCK=1   → Flag
or
ROADEDITOR_ADDITIONAL_OPTIONS : MAX_WEIGHT=20000   → Conditional
or
ROADEDITOR_ADDITIONAL_OPTIONS : OPT_MALUS1=200   → Malus

or comma separated
ROADEDITOR_ADDITIONAL_OPTIONS : BLOCKS_TRUCK=1, MAX_WEIGHT=20000

> **com.ptvag.xserver.xroute.RoadEditorOptions**

Notes (1)

> xRoute 1.4/.6 → RoutingOption "ROADEDITOR_ATTRIBUTESET" (deprecated)
  xRoute 1.8   → RoutingOption "ROADEDITOR_LAYERNAME"

> If LAYERNAME is given
    database approach   →   ATTRIBUTESET + „.db"
    binary layer approach   →   ATTRIBUTESET

> Folder „/dyn" is expected to be deleted manually (stop service before)

> It is possible to generate several independent layers

> Layer export:
  → Overwriting an existing binary layer requires restart of xRoute
  → To avoid restart of xRoute export the layer into a non-existing filename and request a
  new logical shared memory file

> XMap:
  1. visualization of binary layers is possible (RoadEditorLayer) but as the binary layer
  doesn't contain text label information the map will not contain labels (only icons)
  2. database layers cannot be displayed at all (xmap 1.8)

Notes (2)

> Binary layer export from MAP&GUIDE 2009 is considering only those blockings that are active during export timestamp

Therefore it is not possible to consider time dependent blocking for different START_TIME_ROADEDITOR
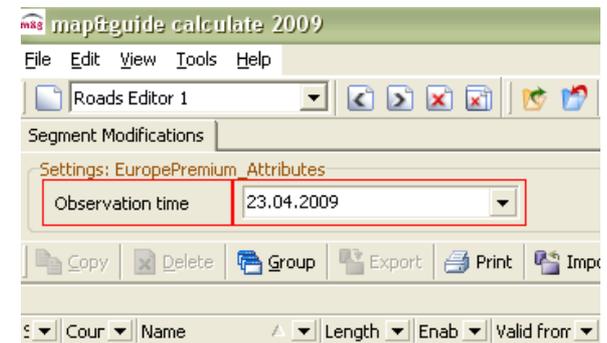
> XRoute provides „LayerGenerator" : it is possible to consider time dependent blockings when using the database approach

> Automatic LayerExport is performed whenever one of the following conditions changes:

→ Database: Attributeset.LastModified is touched
→ START_TIME_ROADEDITOR is no longer valid considering the time intervals of the current time dependent blockings

Attention: lack of performance!

Map update

> Semi automatic within M&G 2009 / road editor

> Object mapping based on geographic position during installation of a new map

> Hit rate: about 90% from map version to map version

> Hangovers: manual post-processing within M&G 2009 / road editor

Advantages / Disadvantages

Database	Binary layer
-Only with xRoute-WIN	+ Works with xRoute-linux
+ Considers Time dependent blockings	- No time dependent blockings
+ up2date automatically	- Requires manual binary export whenever conditions change
MS.Access: xRoute has to be installed locally or must have access to the MDB file	+ xroute may be installed in remote network (requires manual FTP)
- database layers cannot be displayed in xMap 1.8	+ can be displayed in xMap 1.8

Advantages / Disadvantages

Windows	Linux	Both
		visualization of binary layers within xMap 1.8 request is possible
Direct access to the SQL database layers, even from remote machines. MDB database layers accessible from local machine	No access to the database layers at all	Access to binary layers (requires access to file system or transfer via FTP)

Future prospects

> Turning restrictions

>> Types of turning restrictions

>> Insert of turning restrictions

>> Delete of turning restrictions

> Optimization of the data structures (because of very large amounts of data within TruckAttributes)

How to proceed at all

> Installation of map&guide (requires setup and serial number)

> Integration of xServer standard map into map&guide

> Enable "road editor export" within map&guide

> Enable "road editor database" within map&guide

> How to change segment attributes with map&guide

> How to export database layers into binary layers

> How to configure binary layers within xRoute 1.8

Installation of map&guide

> Installation of map&guide in standard procedure

Integration of xServer standard map into map&guide

Precondition:

> installed version of MAP&GUIDE on windows desktop

> Zip archive with ini-files

> Reg-file

> Serial number of the map (must correspond to the reg file)

Integration of xServer standard map into map&guide

Step-by-step 1

> Create a subfolder "/maps" below map&guide installation path

> Copy the xServer map to that "/maps" folder into a subfolder that ends with ".geo" (we recommend to use the map version name without blanks)

> Copy the ini-files to the map subfolder (do not override existing files)

> Edit „map.ini":
  - replace the given map name by the one you just installed

> Edit „map.ini":
  ```
  Version.Major=15
  Version.Minor=1
  ```
  These versions depend on the used map:
  15.0 → Premium 2008-3a
  15.1 → Premium 2009-1
  15.1 → Premium 2009-1a

# Integration of xServer standard map into map&guide

Step-by-step 2

> Copy the ".reg" file into [map&guide]/prog

> Start map&guide. You will get prompted for a serial number. Enter the maps serial number

> Disable the built-in truck attributes (options / roadeditor / own)
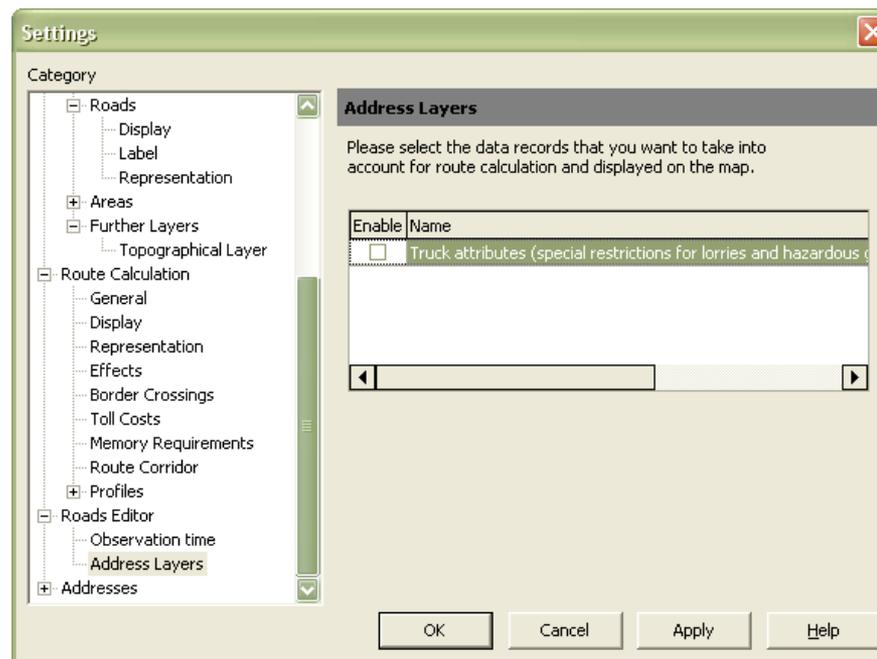
Enable "road editor export" within map&guide

> Edit [map&guide]/prog.mov/roadeditor/RESettings.ini:

> Mandatory:
> `[COMMON]`
> `ExportLayers=1`

exportLayers=0
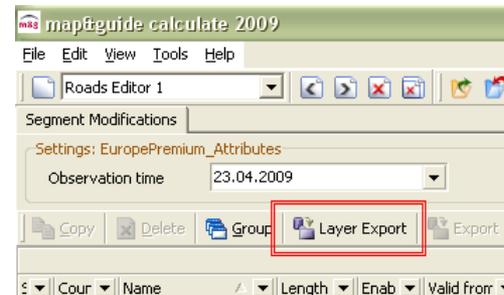

exportLayers=1

> After restarting map&guide the "layer export" button appears within "map&guide road editor"

Enable "road editor export" within map&guide

> Create a new subfolder "/re" below the map subfolder

> During the initial road editor export in map&guide you will get prompted for the "export path". Enter the newly created "/re" folder.
> Future exports to binary layers will provide the files in that folder
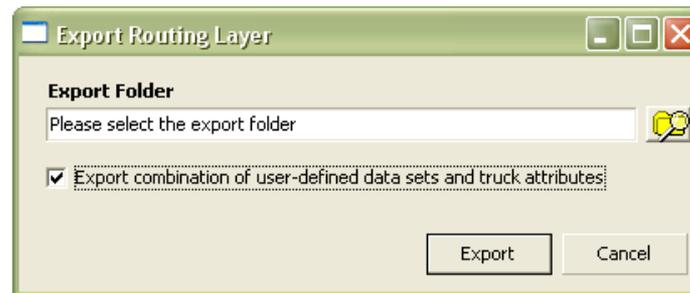
> If the xRoute server has direct access to that folder (e.g. because it uses the same reference to the map&guide map) you can specify the names of these binary layer files.

# Enable "road editor database" within map&guide

> Edit [map&guide]/prog.mov/roadeditor/RESettings.ini:

> Option 1: MDB database layers (default):
> ```
> [DBConfig]
> Location=0
> ```

> Option 2: MS SQL database layers (optional):

1. ```
   [DBConfig]
   Location=1
   ```

2. create a database (e.g. RoadEditor) and a sql user (e.g. RoadEditorAdmin) on the MS SQL server

3. assign the database to be the users default database and make him become the dbo

4. RESettings.ini: provide a proper connection string
   ```
   [DBConfig]
   Location=1
   Connection=Provider=SQLOLEDB.1;Password=RoadEditorAdmin;Persist Security
   Info=True;User ID=RoadEditorAdmin;Initial Catalog=RoadEditor;Data
   Source=nka-wn-bwe
   ```

5. Start map&guide → several database objects will be generated automatically

> Retrieve the name of the database layer from the table "REAttributeSet"

How to change segment attributes with map&guide

> Simply look into the map&guide documentation of business case "road editor"

How to export database layers into binary layers

> After editing segment attributes within the map&guide user interface you can export the current database information into binary files by clicking "layerexport"

> The result files are

1. TruckLayer.bin + TruckLayer.bin.lif
   These are the standard truck attributes

2. OwnAttributes_0.bin + OwnAttributes.bin.lif
   These are your own customized segment changes

3. (only if checkbox is enabled during export)
   Combi.bin + Combi.bin.lif
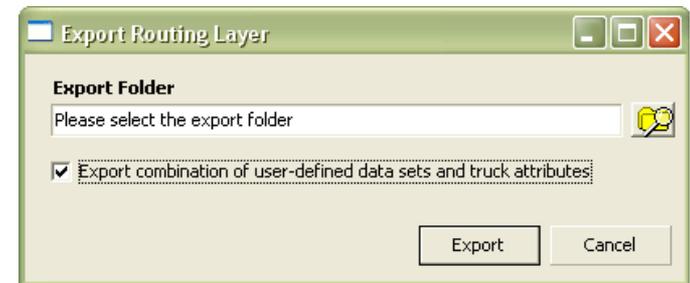
As the "layer access component" is not able to deal with several independent RE layers at the same time you have to decide which binary layer to request:
the standard truck attributes → "**TruckAttributes**"
your customized attributes → "**OwnAttributes_0**"
Both standard and customized → "**Combi**"

Attention: the binary files will not contain segment attributes with time intervals that do not match the "export timestamp"!
If you need to consider different time intervals you have to export several binary layers manually!

Attention: After the manual export you must restart the xServers to make changes in the binary layers take effect!

How to configure bin layers within xRoute/xMap 1.8

> Both engines require a specific license key to enable RoadEditor:

> `xmap.layers.roadEditor=true`

  `xroute.roadEditor=true`

> If the servers have access to the map&guide machine itself:

  /conf/xmap.properties and /conf/xroute.properties
  → `map.path=[map&guide]/maps/theMap.geo`

> Otherwise:
  → `map.path=[path to the map]`
  configure `reLayer.path` and `reLayer.sharedMemory`

> Finally configure the desired profiles within xRoute (do not forget ".db" when using database layers)

Overview

The following slides give a rough overview of possible integration scenarios.

> map&guide RoadEditor requires WIN platform
> The client application may be hosted on any kind of operating system.

1. map&guide RoadEditor + xRoute/xMap on same machine (all WIN)
2. map&guide RoadEditor + xRoute/xMap on separated machines (all WIN)
3. map&guide RoadEditor on WIN, xRoute/xMap on Linux

Overview 1 – one machine (WIN)

MS SQL Server

RE.MDB
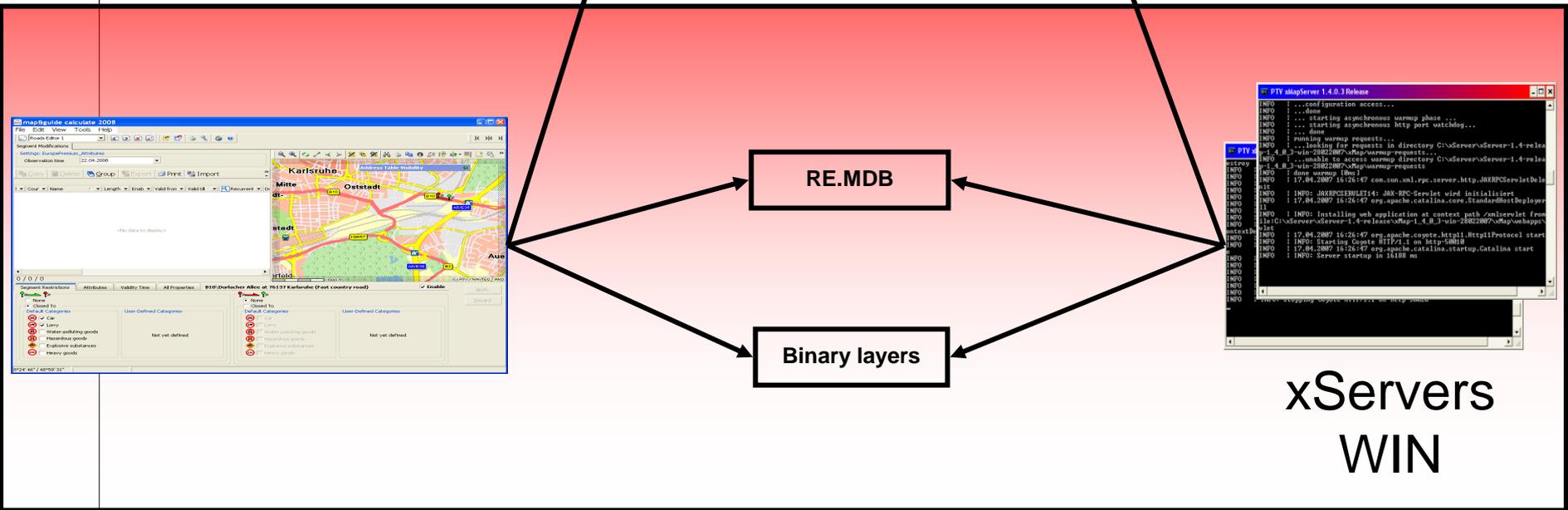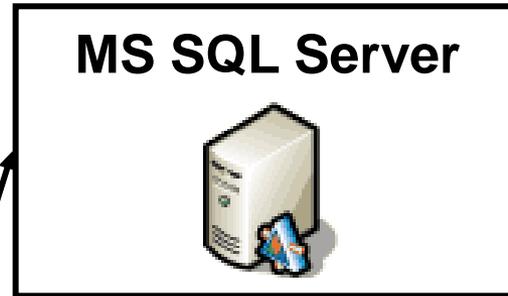
Binary layers

xServers
WIN

Overview 2 – separated machines (WIN)
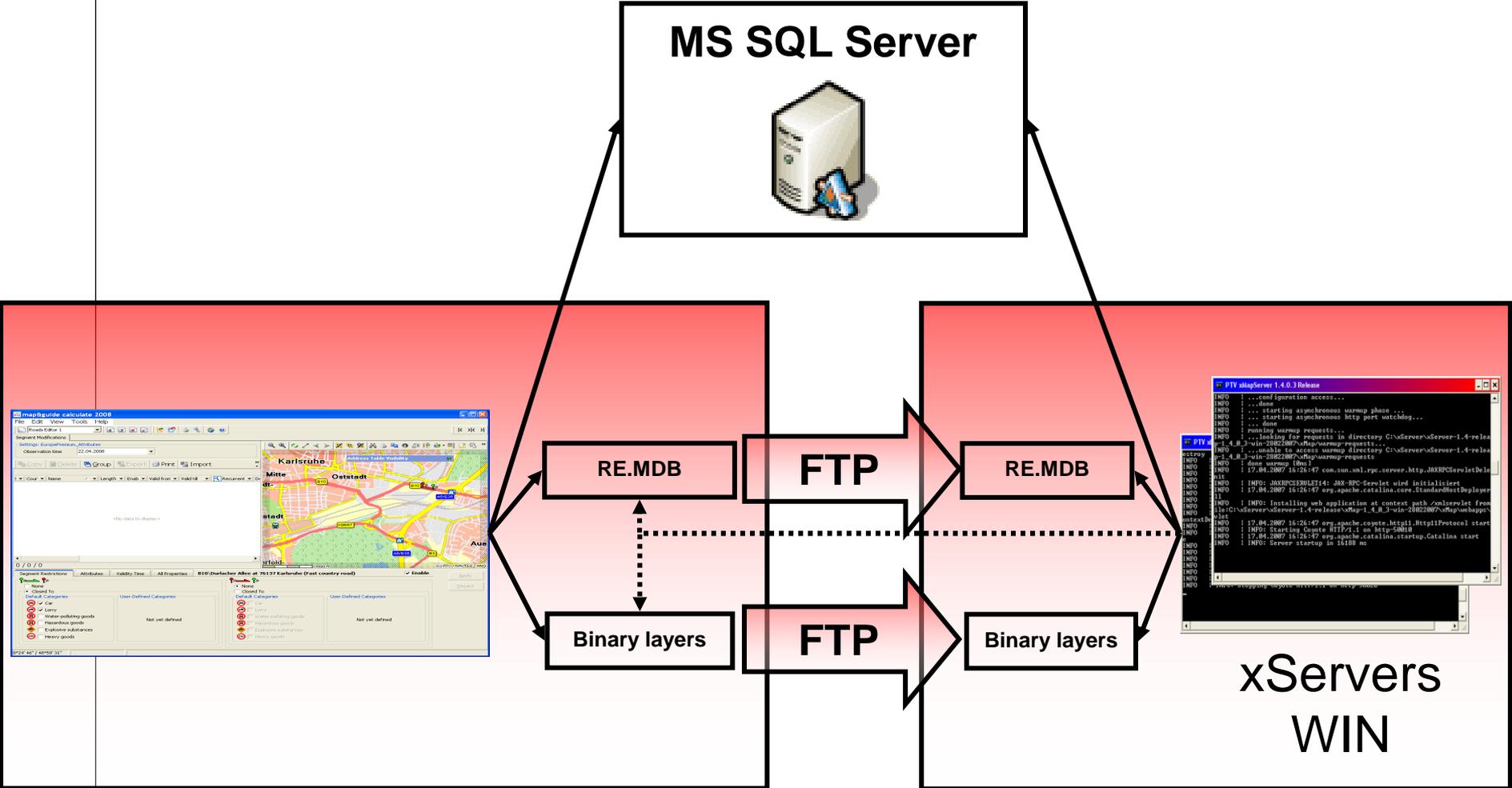
Overview 3 – separated machines (LINUX)

Binary layers → **FTP** → **Binary layers**

xServers LIN
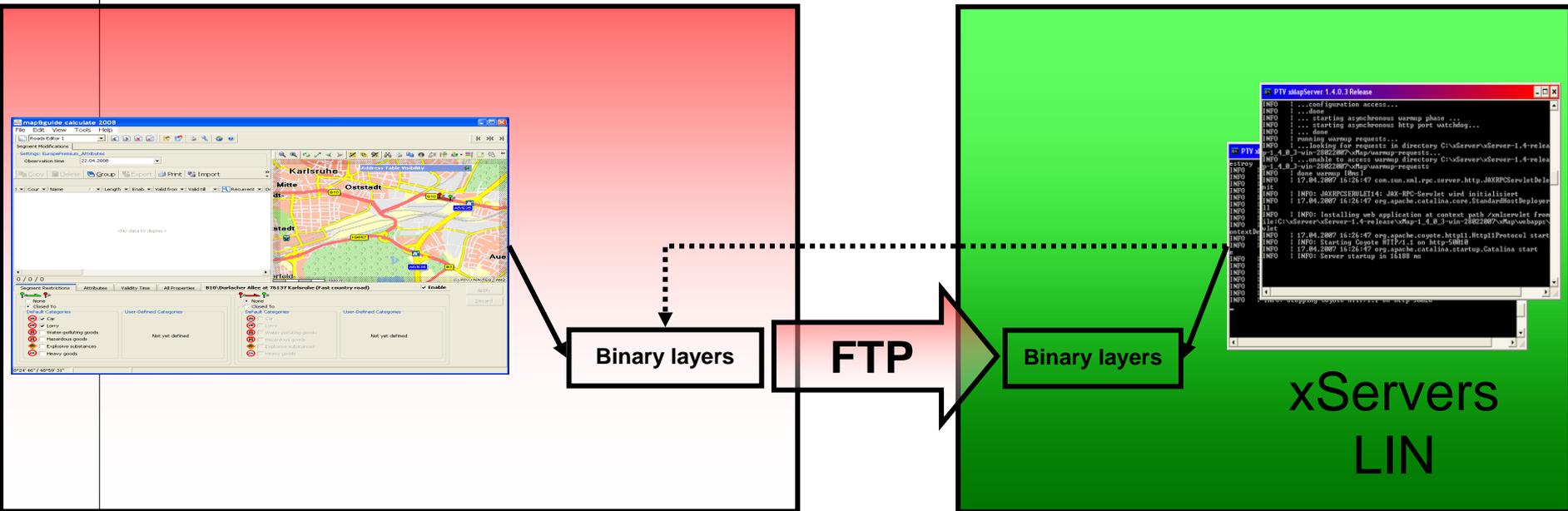
Scenario 1 – linux + several binary layers

> **Precondition**

> WIN: map&guide professional

> LINUX: xRoute 1.8 / xMap 1.8, no direct access to WIN machine

> **Required**

> Large number of time dependent road blockings to be considered

> Start time for routing has to be flexible within long term period
(e.g. on a daily basis within next year)

Scenario 1 – linux + several binary layers

> **Approach – admin environment**

> Manual binary layer export
  → for every required day (observation timestamp) within 100% period

> Every binary layer file has to be renamed according to the observation "day"
  → e.g. 2009-05-01.ownAttributes.bin

> Whenever a new road blocking interval is inserted
  → every day within the new interval has to be reexported

> Administrator pushes new binary layers to xServers

> Restart of xRoute/xMap required to clean up shared memory status

> **Approach – client environment**

> Client has to request binary layer name according to the start time of the routing
  e.g. START_TIME_ROADEDITOR = "2009-05-01T13:20:00-05:00"
  → ROADEDITOR_LAYERNAME = "2009-05-01.ownAttributes"

Thank you very much for your attention

April 2009, PTV AG

ptv
traffic mobility logistics.