

MRDB APPROACH FOR AUTOMATIC INCREMENTAL UPDATE

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ATKIS MRDB

- ▶ Project is funded by the Federal Agency for Geodesy and Cartography (BKG)
- ▶ Integrated consistent storage of all ATKIS data sets in Germany
 - BaseDLM (1:25.000), DLM50 (1:50.000), DLM250 (1:250.000), and DLM1000 (1:1.000.000)
- ▶ Automatic generation of links between related objects of the different DLM's by
 - Matching
 - Generalisation
- ▶ Automatic incremental update of DLM50, DLM250, and DLM1000 based on the changed BaseDLM.

Harmonisation of the ATKIS Object-Catalogues

Example Object type 2315 Building

▶ OK50

- **Capture rule:**
Complete for the DTK50,
Greenhouses only if
building area $\geq 2,5$ ha

Ambiguous! **Object type:**

- point
- area

- **Special object creation rules:**
none

▶ OK250

- **Capture rule:**
Building with high national
or tourist significance

- **Object type:**
- point

- **Special object creation rules:**
none

Not ambiguous

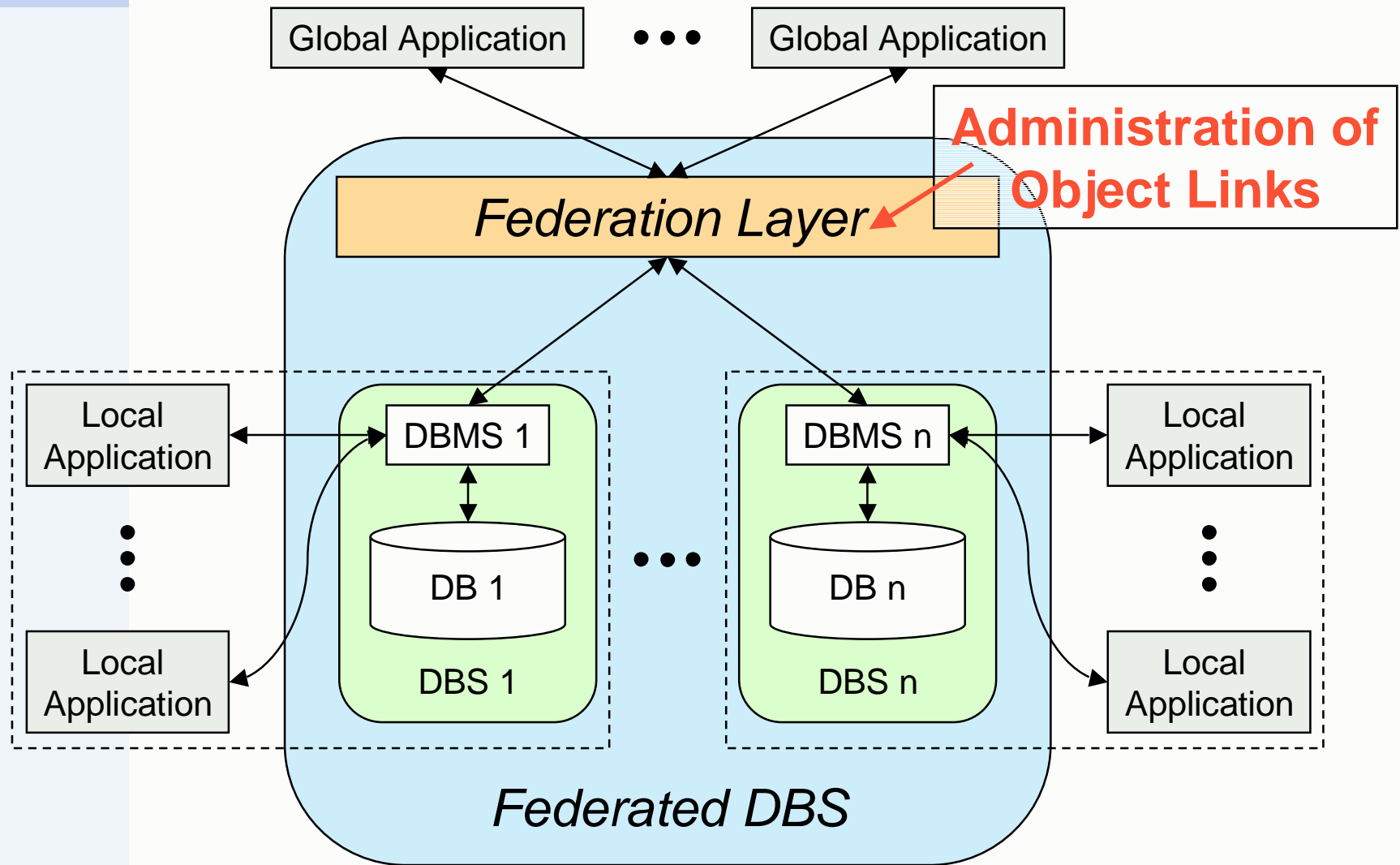
Doesn't fit to the OK50, because the national or tourist significance is not captured in the OK50!

Consequences for the ATKIS Object-Catalogues

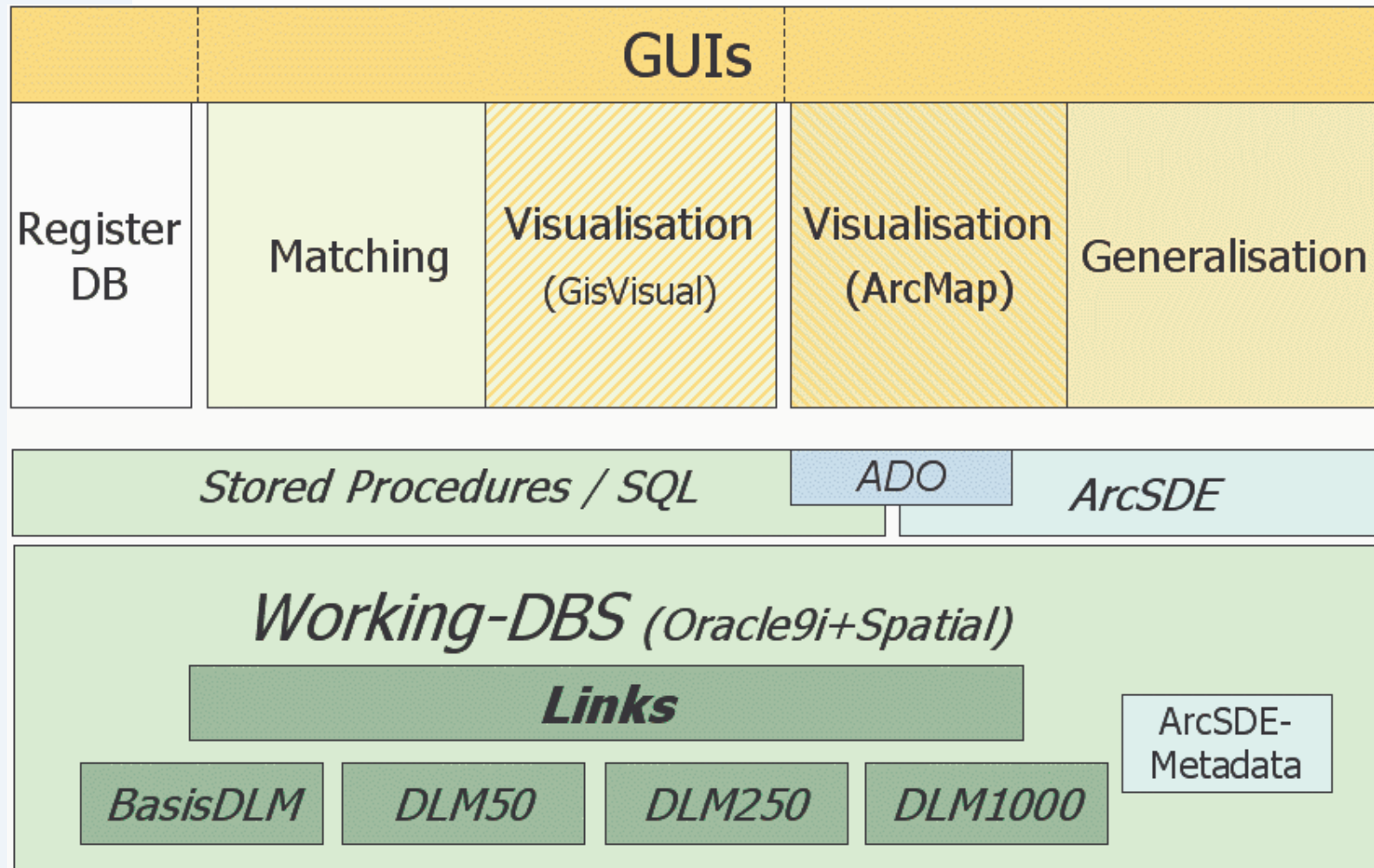
- ▶ Homogenous semantic model
 - $OK1000 \subset OK250 \subset OK50 \subset BasisOK$ for all object types and attributes
- ▶ Capture rules without ambiguities
- ▶ Transition rules from one catalogue to the next following
- ▶ Rules have to be *readable* for computers!
 - Rules understandable only for a human operator are only allowed for the BaseDLM

MRDB System

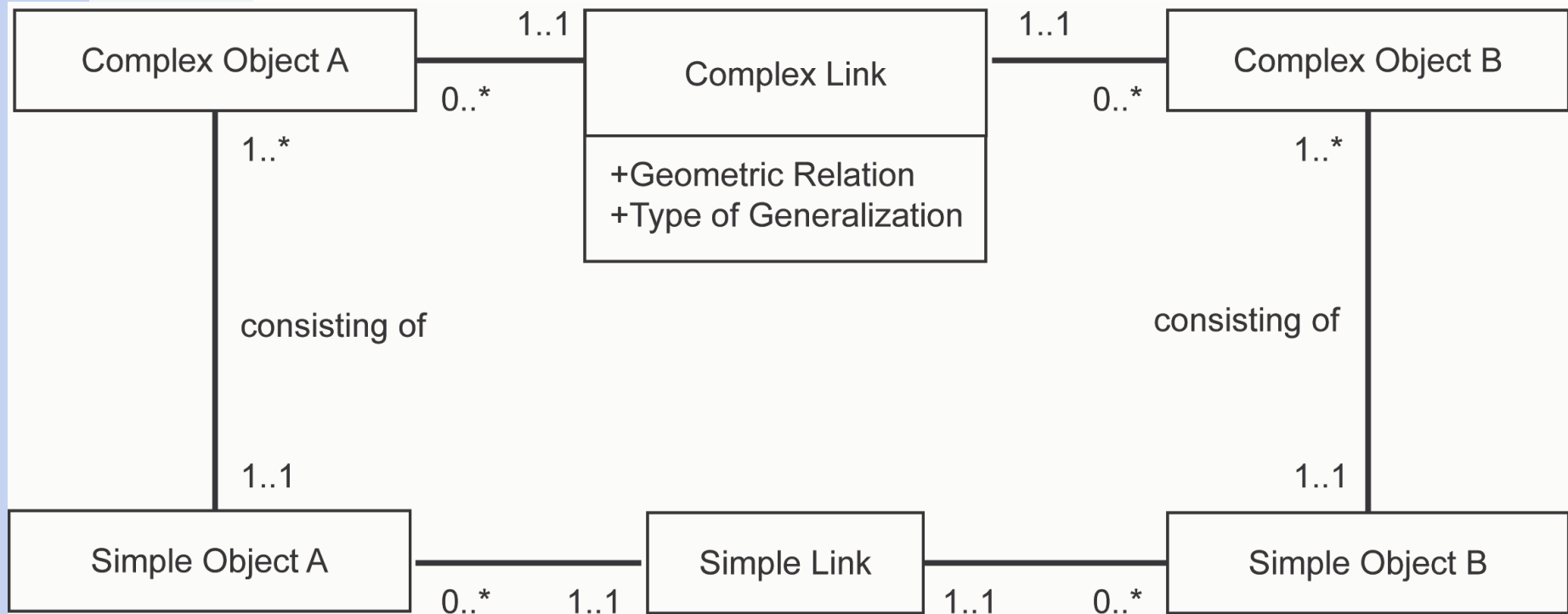
MRDB as a Federated Database System



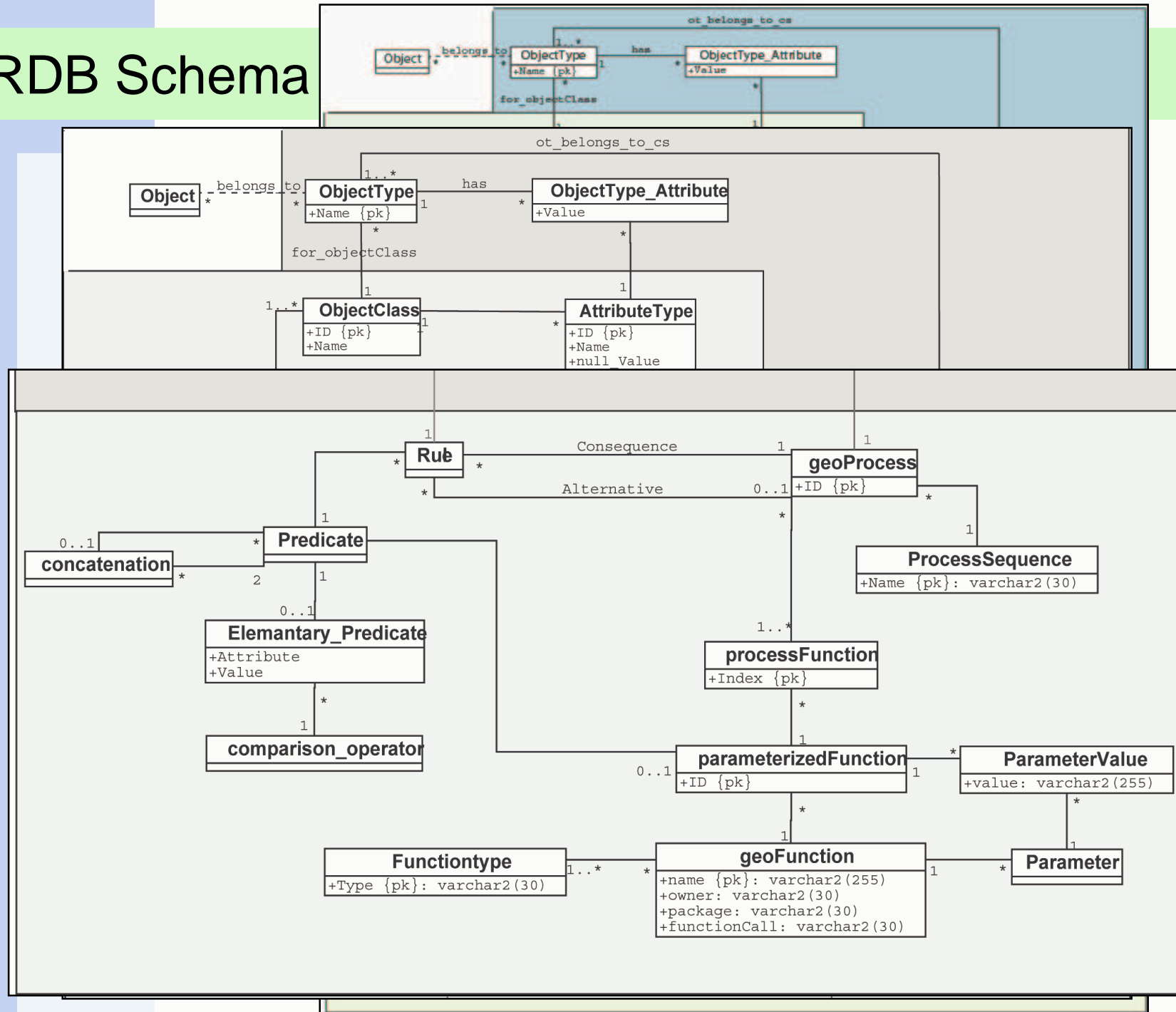
MRDB Prototype: System Components



MRDB Prototype: Object Link Schema

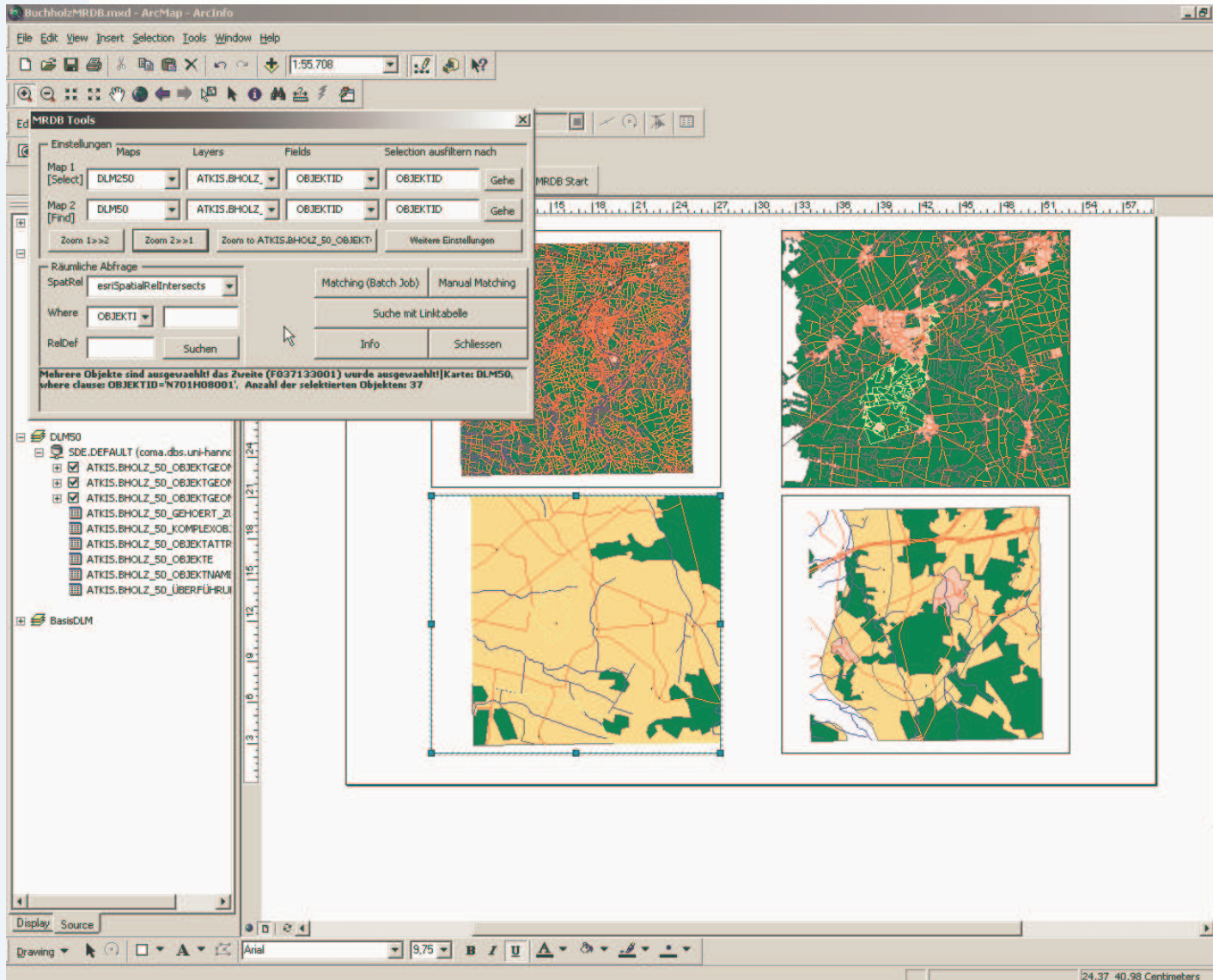


MRDB Schema



MRDB Visualisation

MRDB Visualisation with ArcGIS



ungen Maps Layers Fields Selection ausfiltern nach

DLM250	ATKIS.BHOLZ_	OBJEKTID	OBJEKTID	Gehe
DLM50	ATKIS.BHOLZ_	OBJEKTID	OBJEKTID	Gehe

1 > > 2 Zoom 2 > > 1 Zoom to ATKIS.BHOLZ_50_OBJEKTID Weitere Einstellungen

Die Abfrage

esriSpatialRelIntersects

OBJEKTID

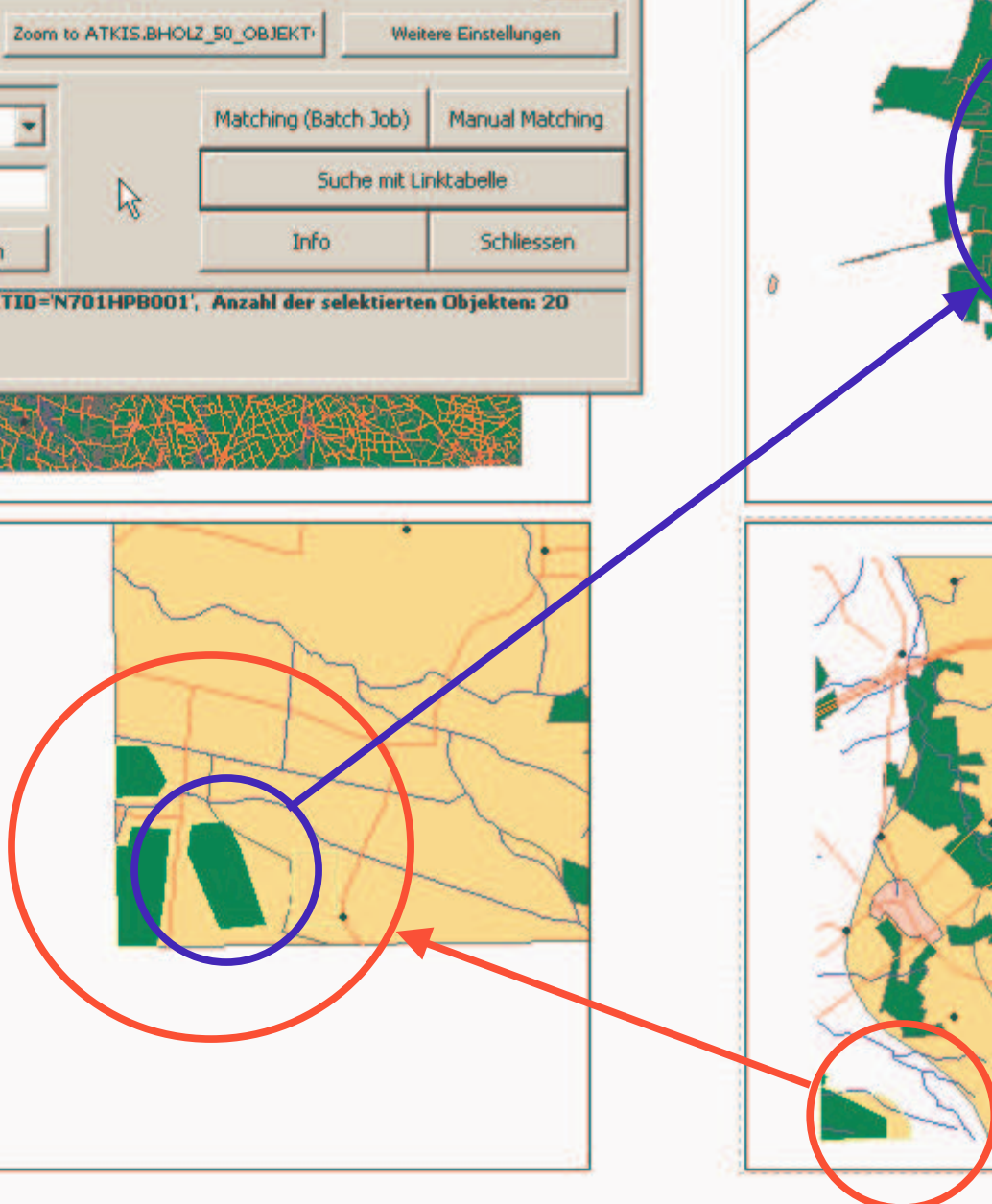
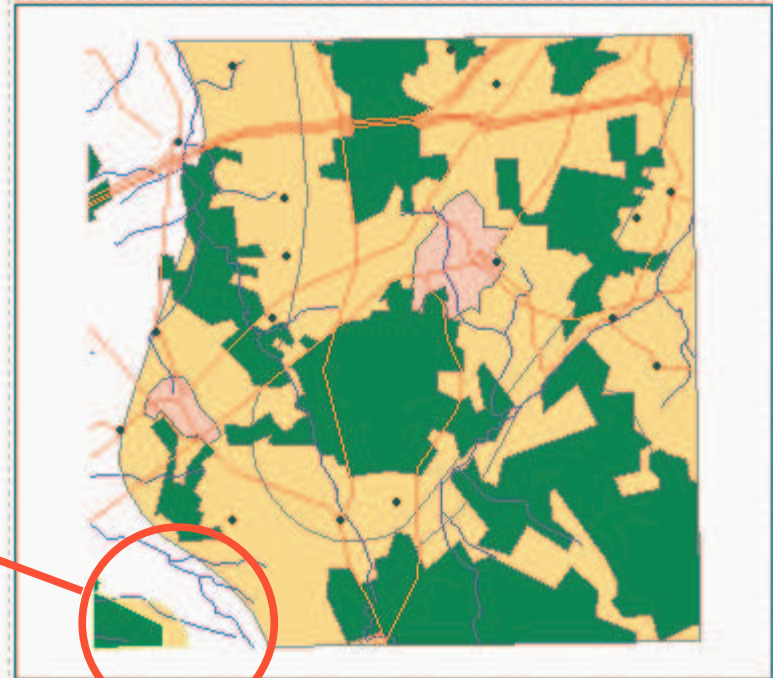
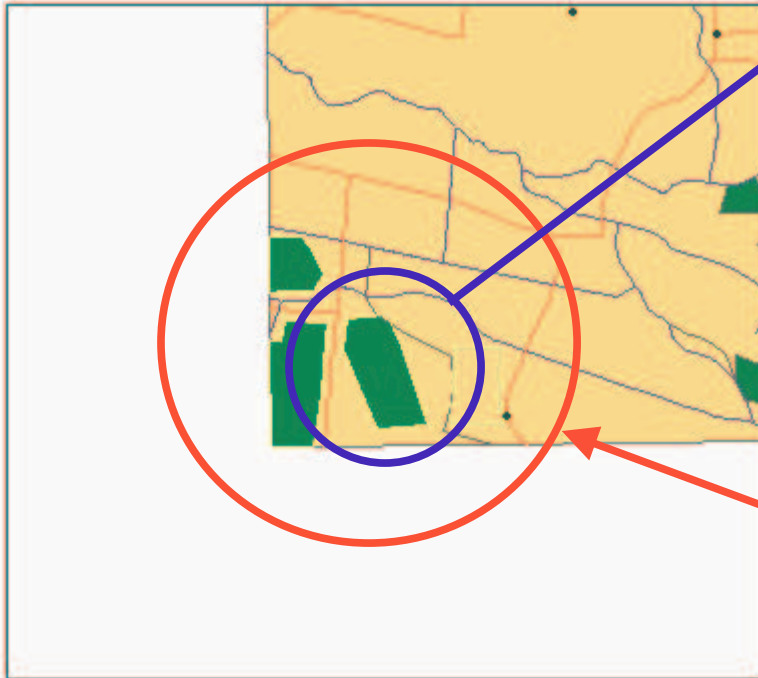
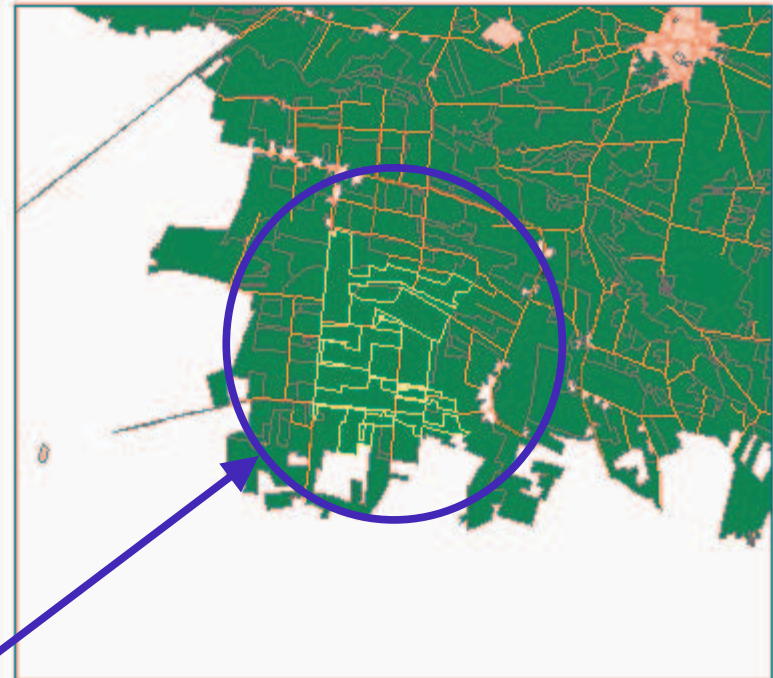
Suchen

Matching (Batch Job) Manual Matching

Suche mit Linktabelle

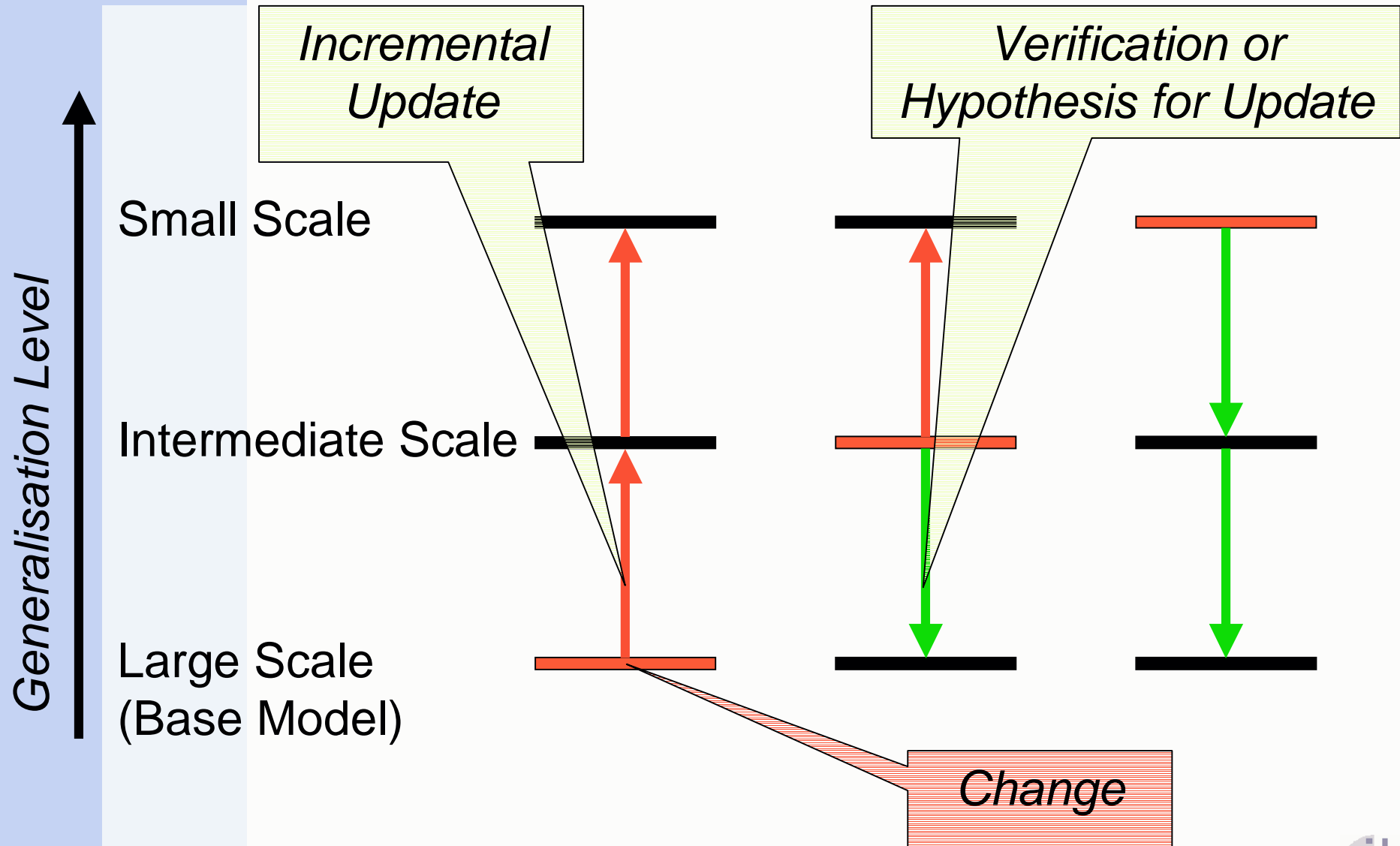
Info Schliessen

DLM50, where clause: OBJEKTID='N701HPB001', Anzahl der selektierten Objekten: 20



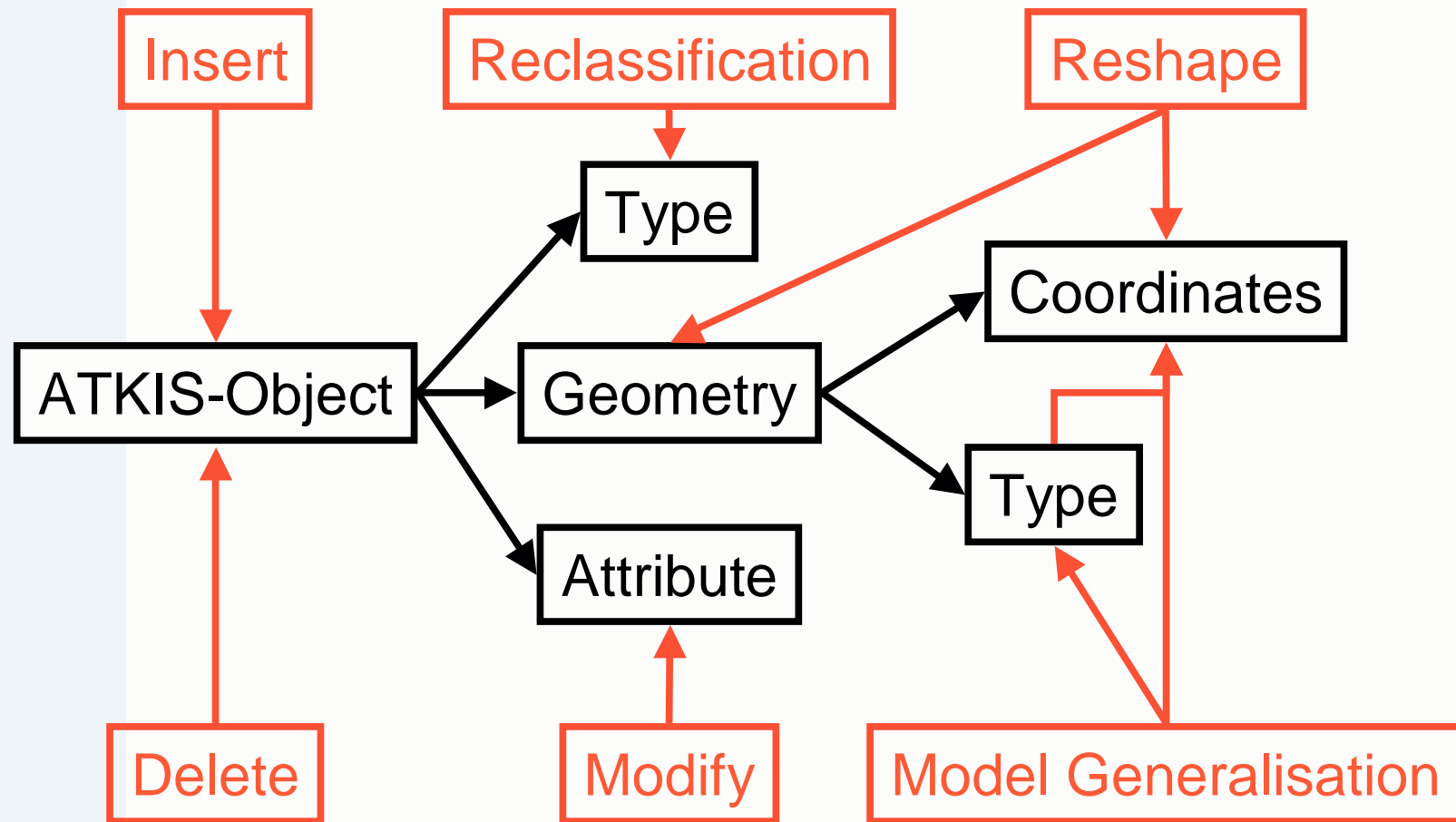
MRDB Update

Update Situations in an MRDB

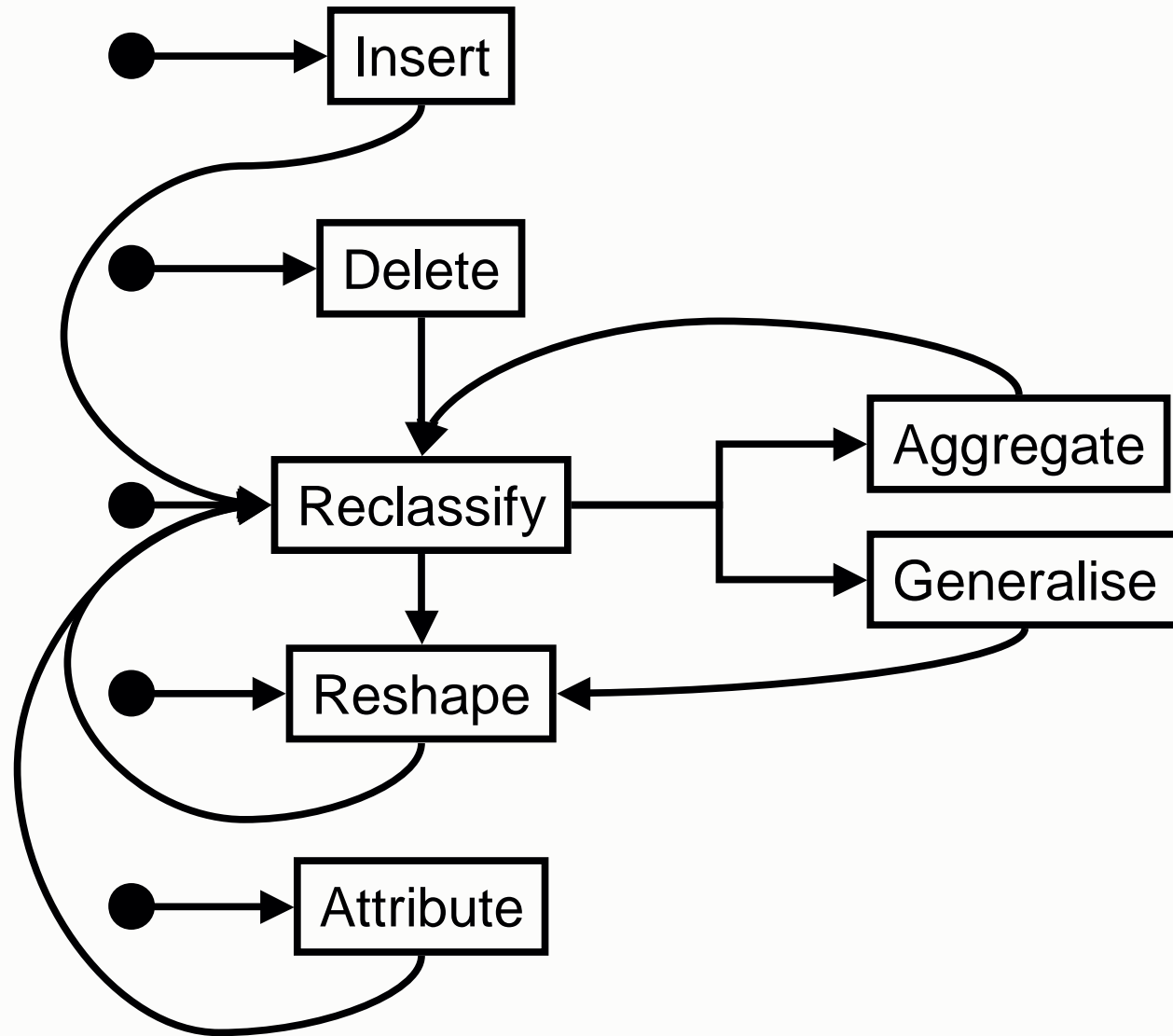


Update Trigger

- ▶ Updates can have different reasons

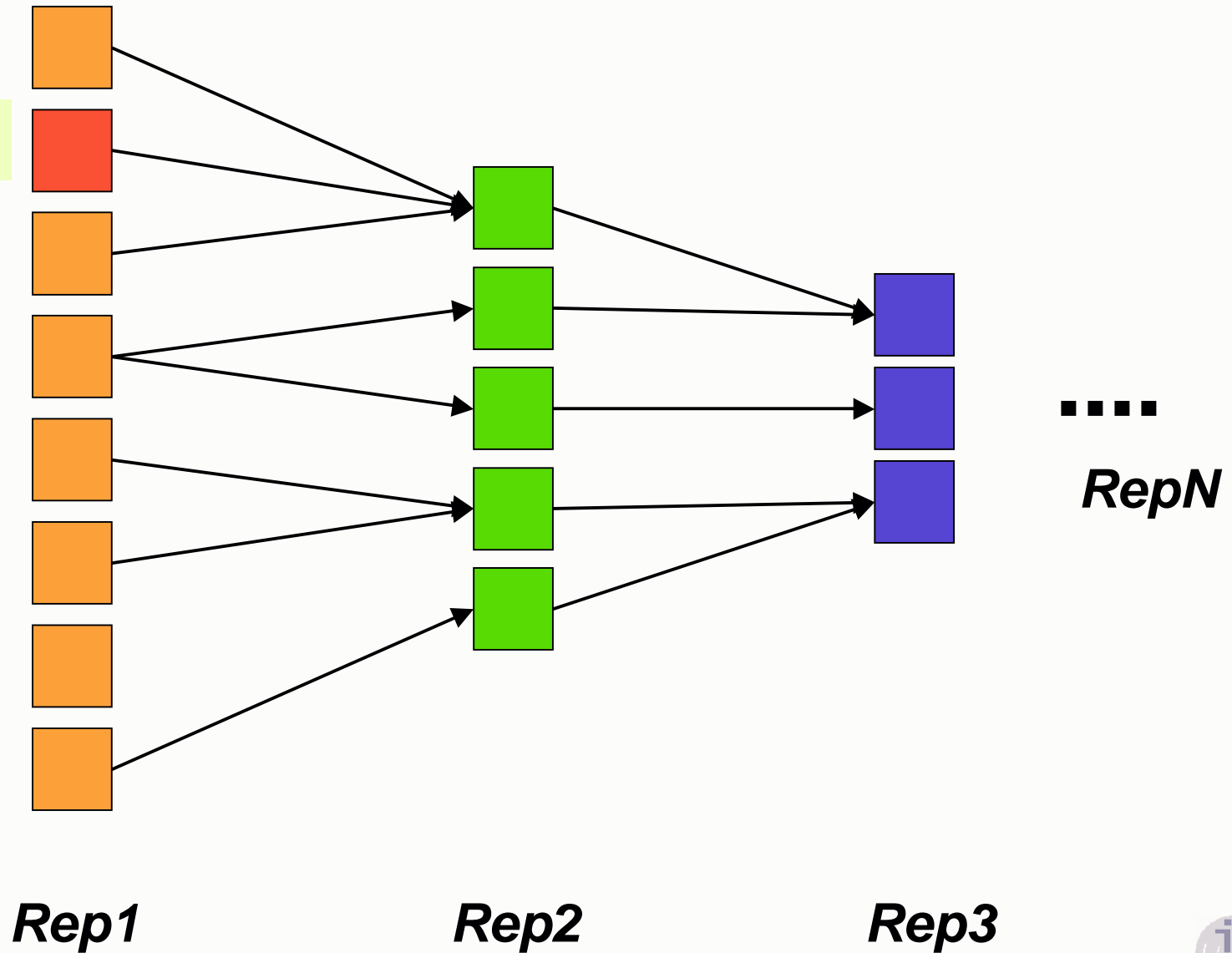


Sequence of Procedures

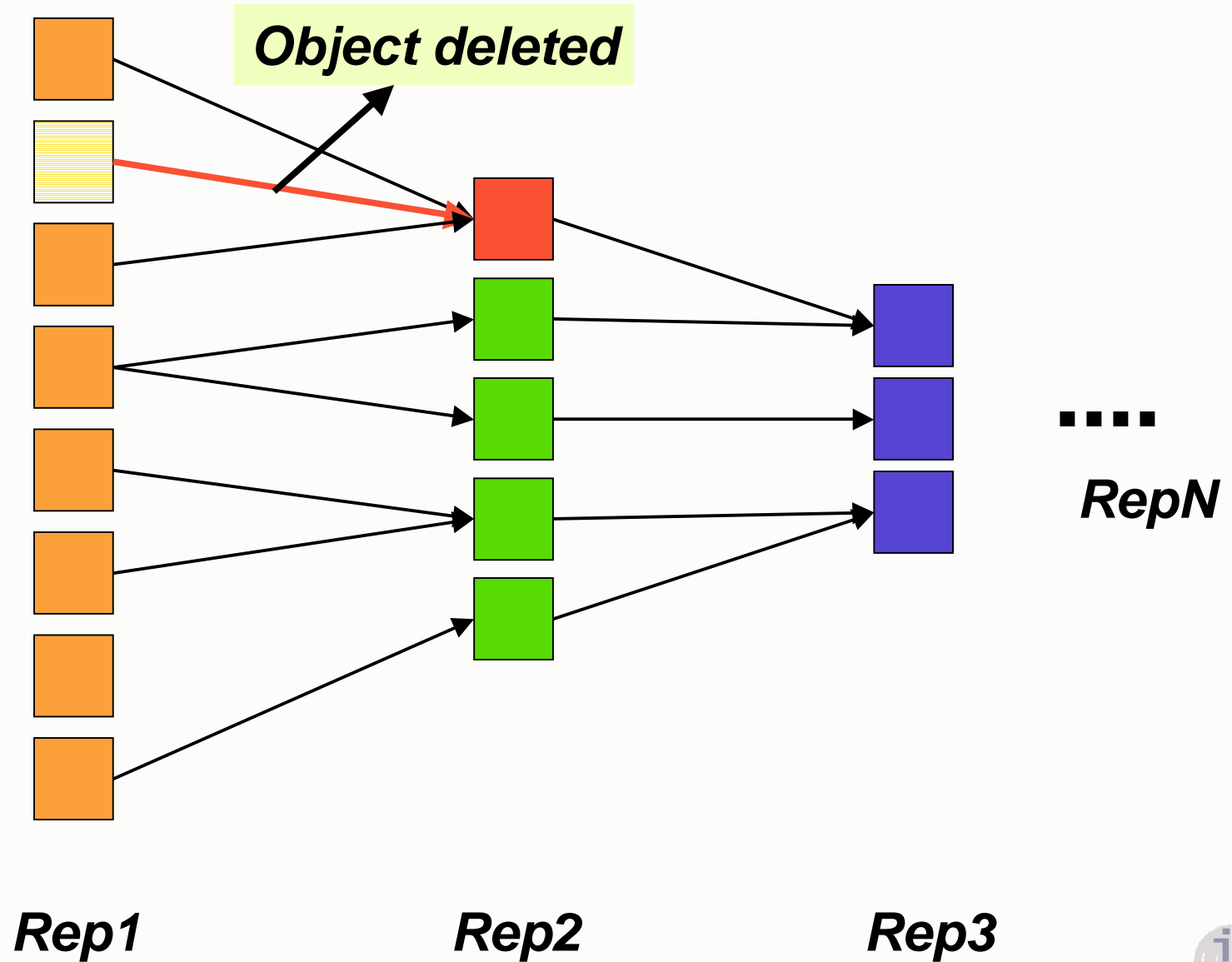


MRDB Update Propagation

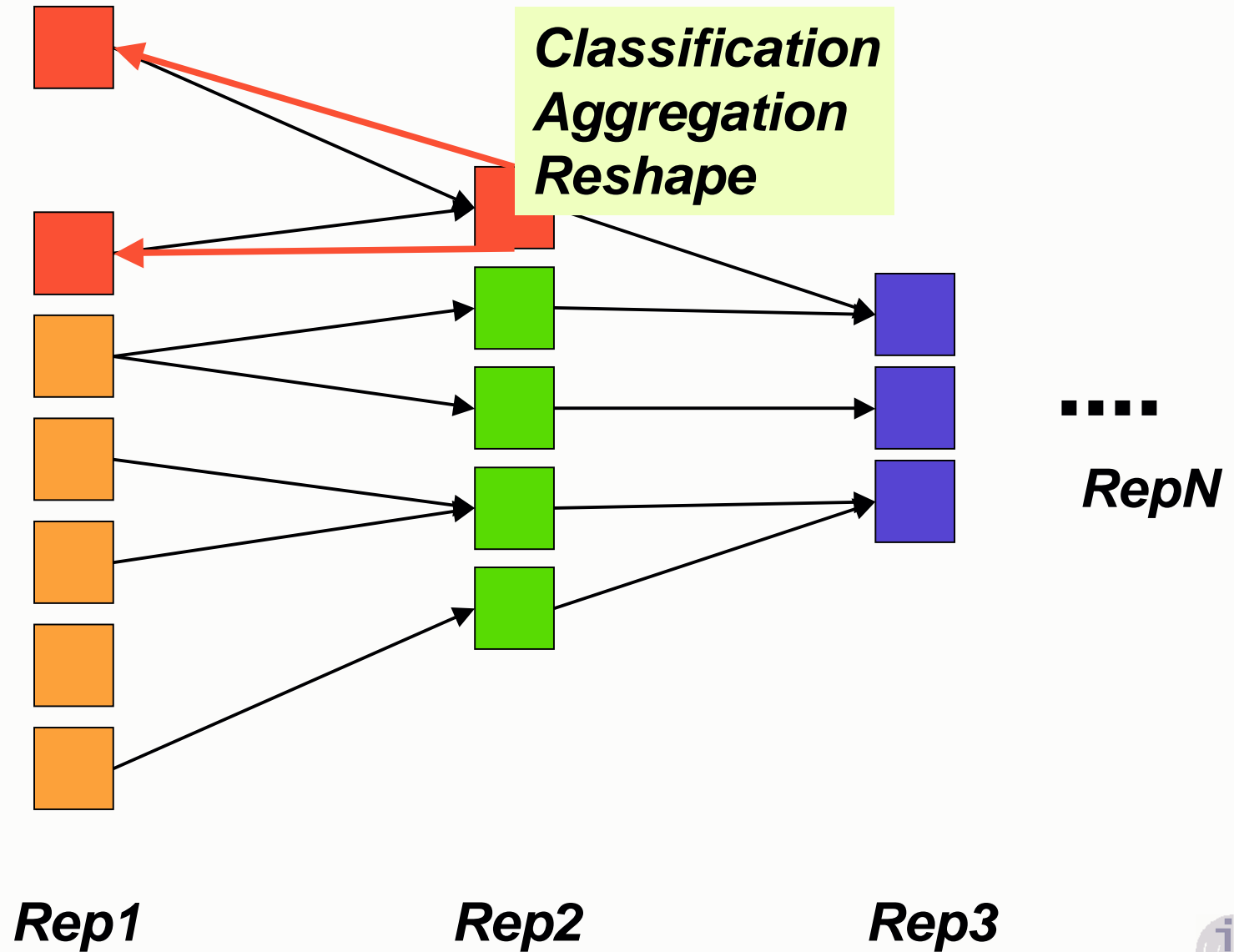
Delete



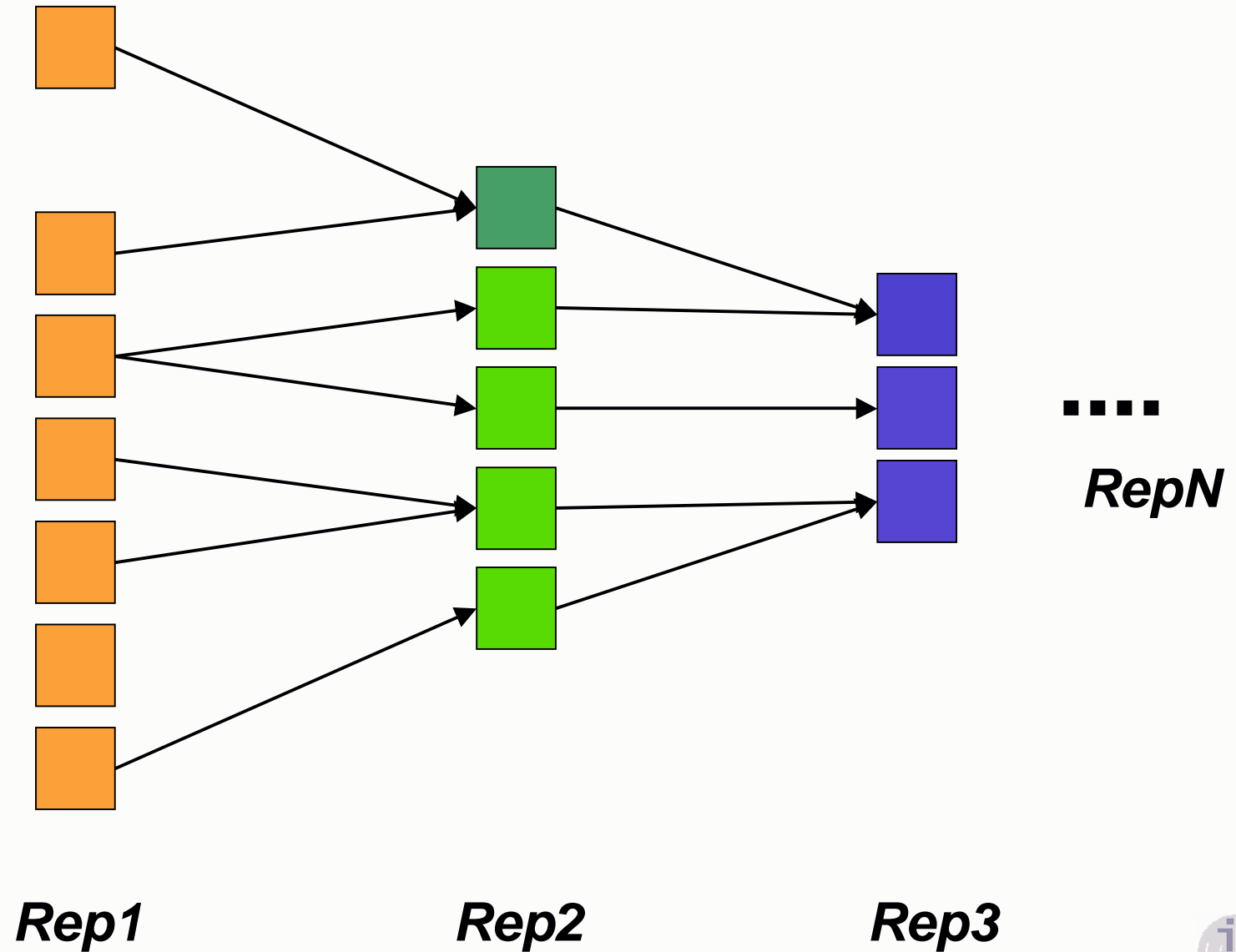
MRDB Update Propagation



MRDB Update Propagation



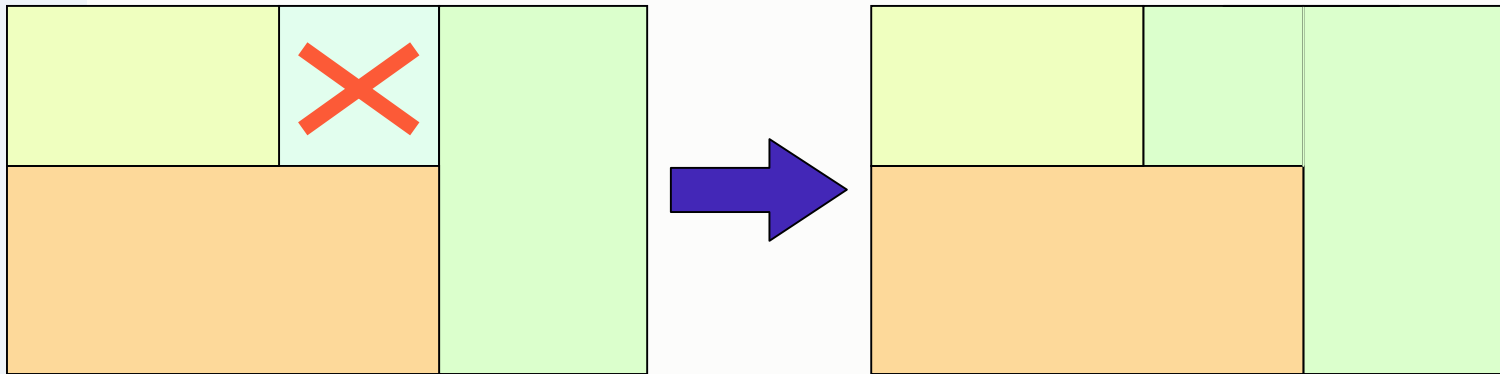
MRDB Update Propagation



Problem using MRDB Links

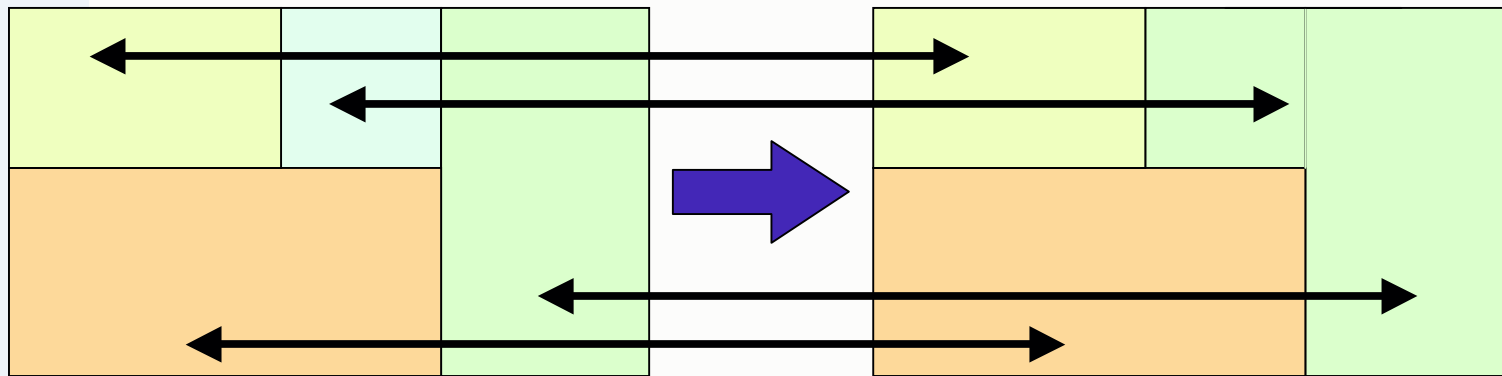
Deleting Object

Priority-Table



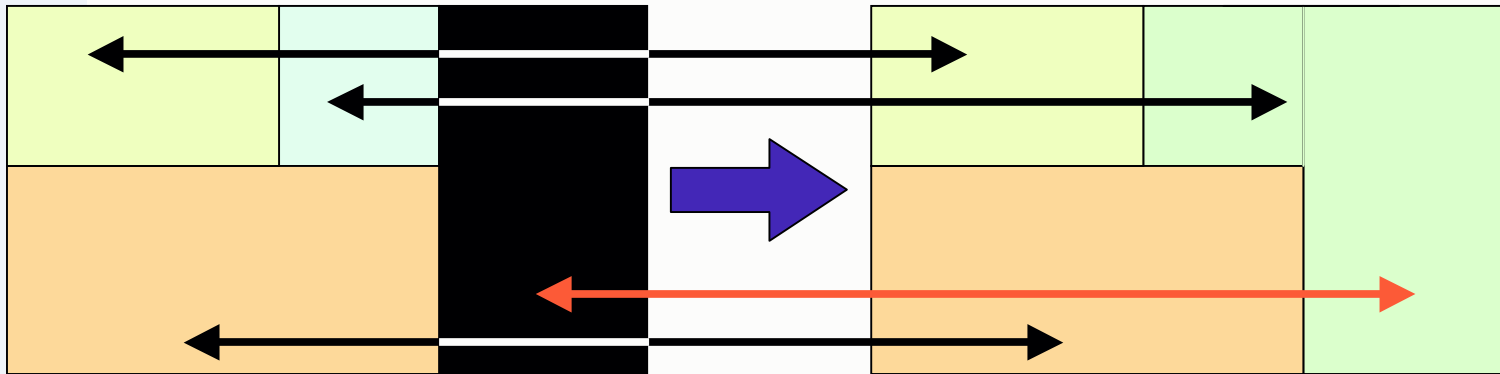
Stored Object Links

Priority-Table



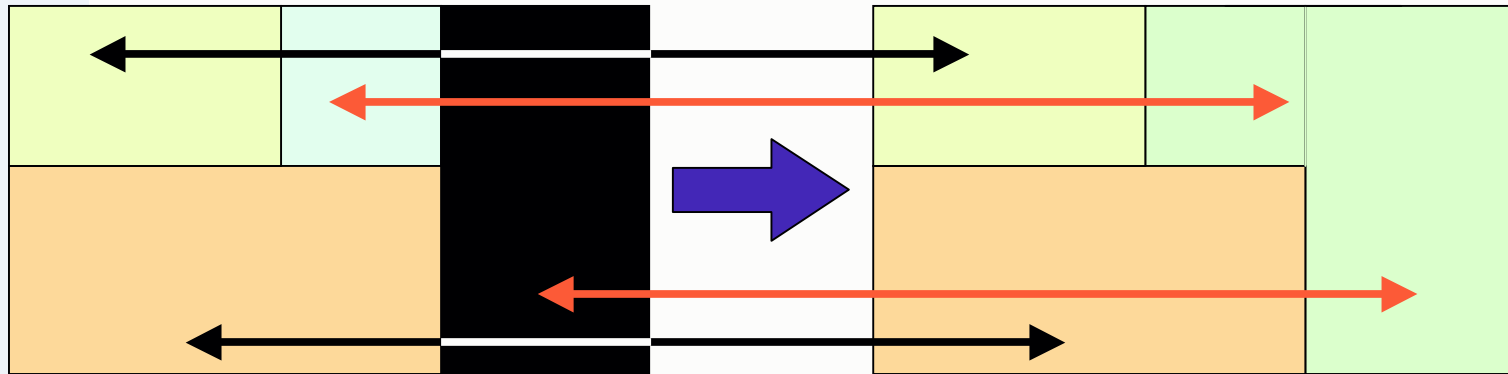
Using Links for Updating

Priority-Table



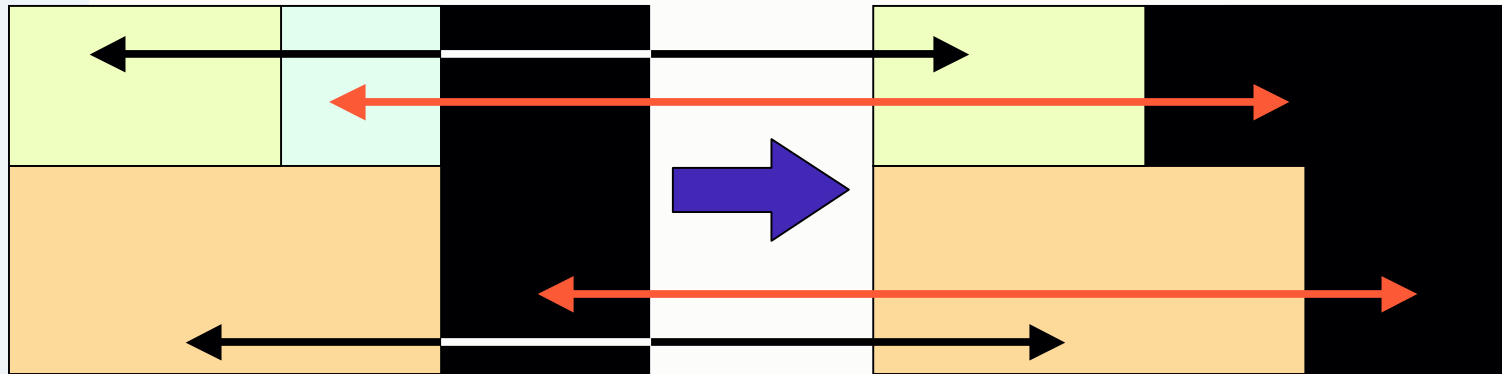
Using Links for Updating

Priority-Table



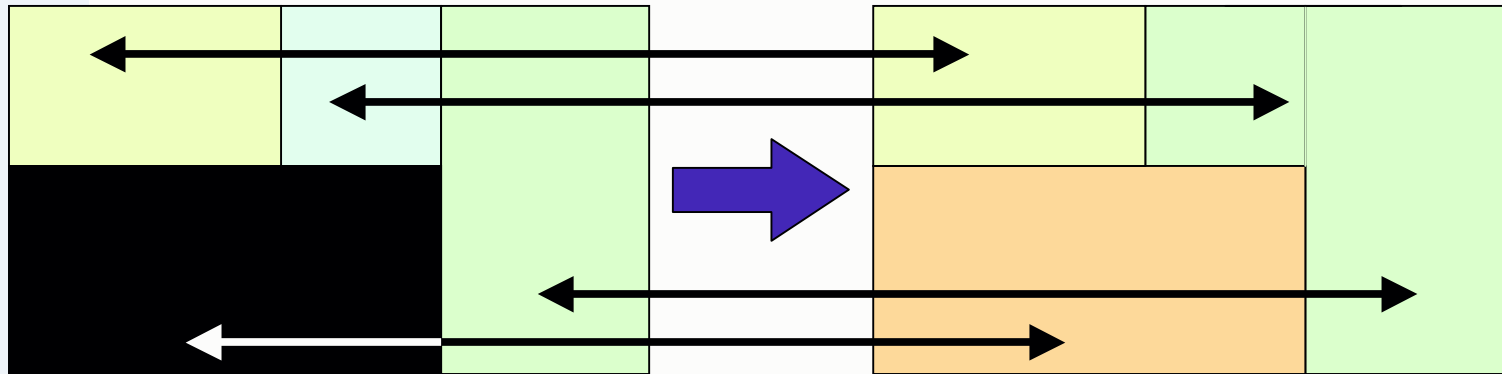
Using Links for Updating

Priority-Table



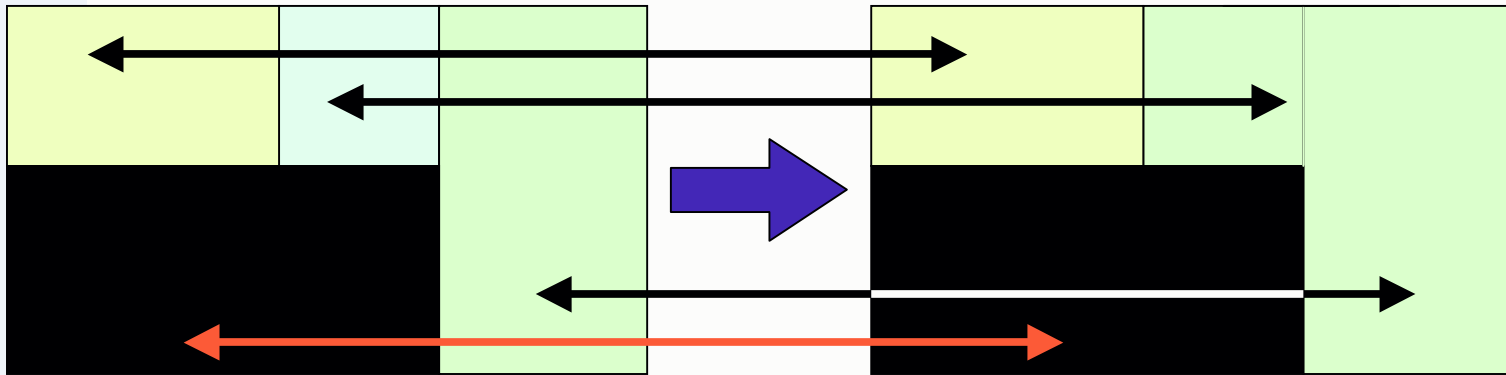
Using Links for Updating

Priority-Table



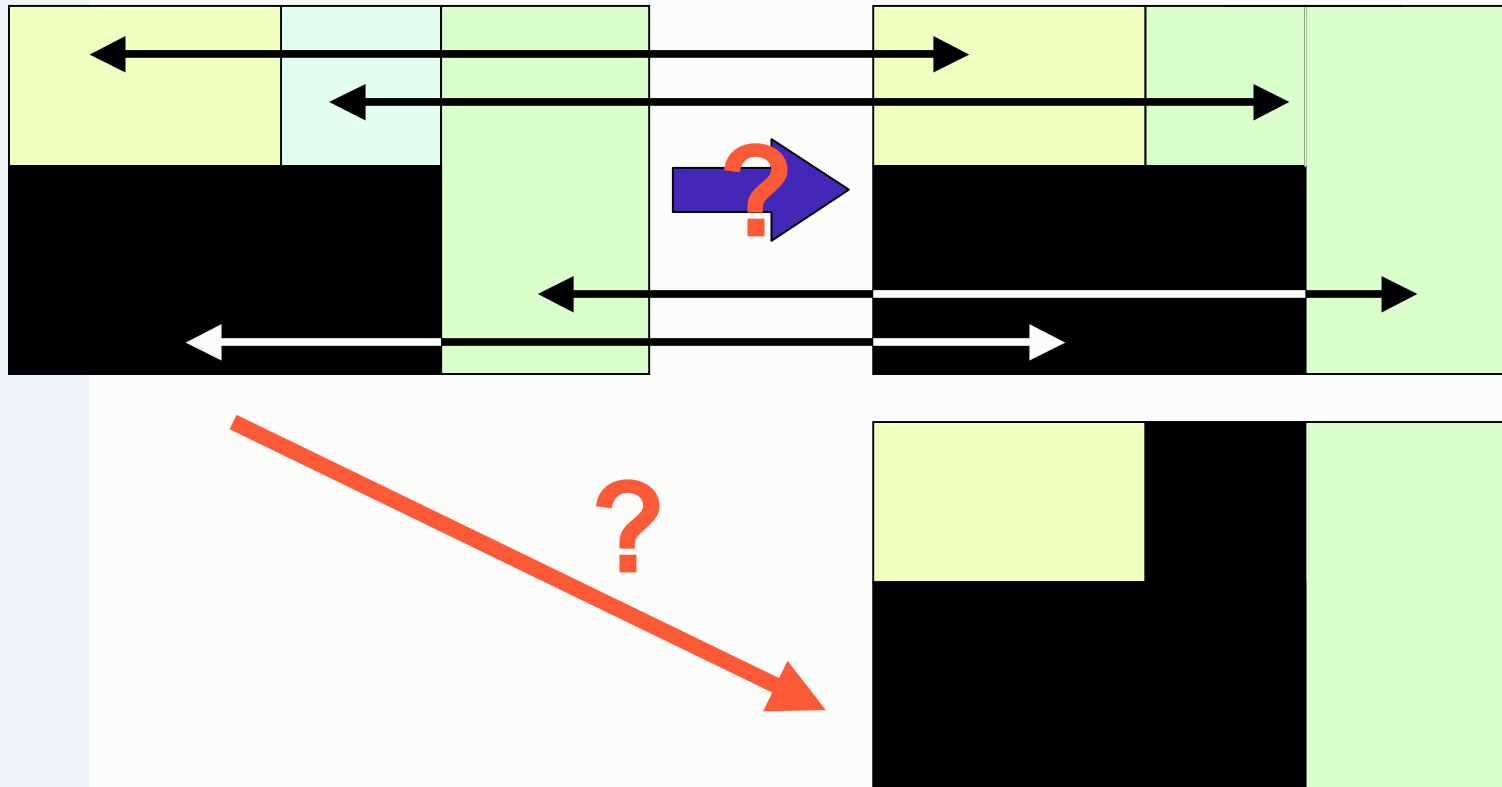
Using Links for Updating

Priority-Table



Using Links for Updating: Wrong or Right?

Priority-Table

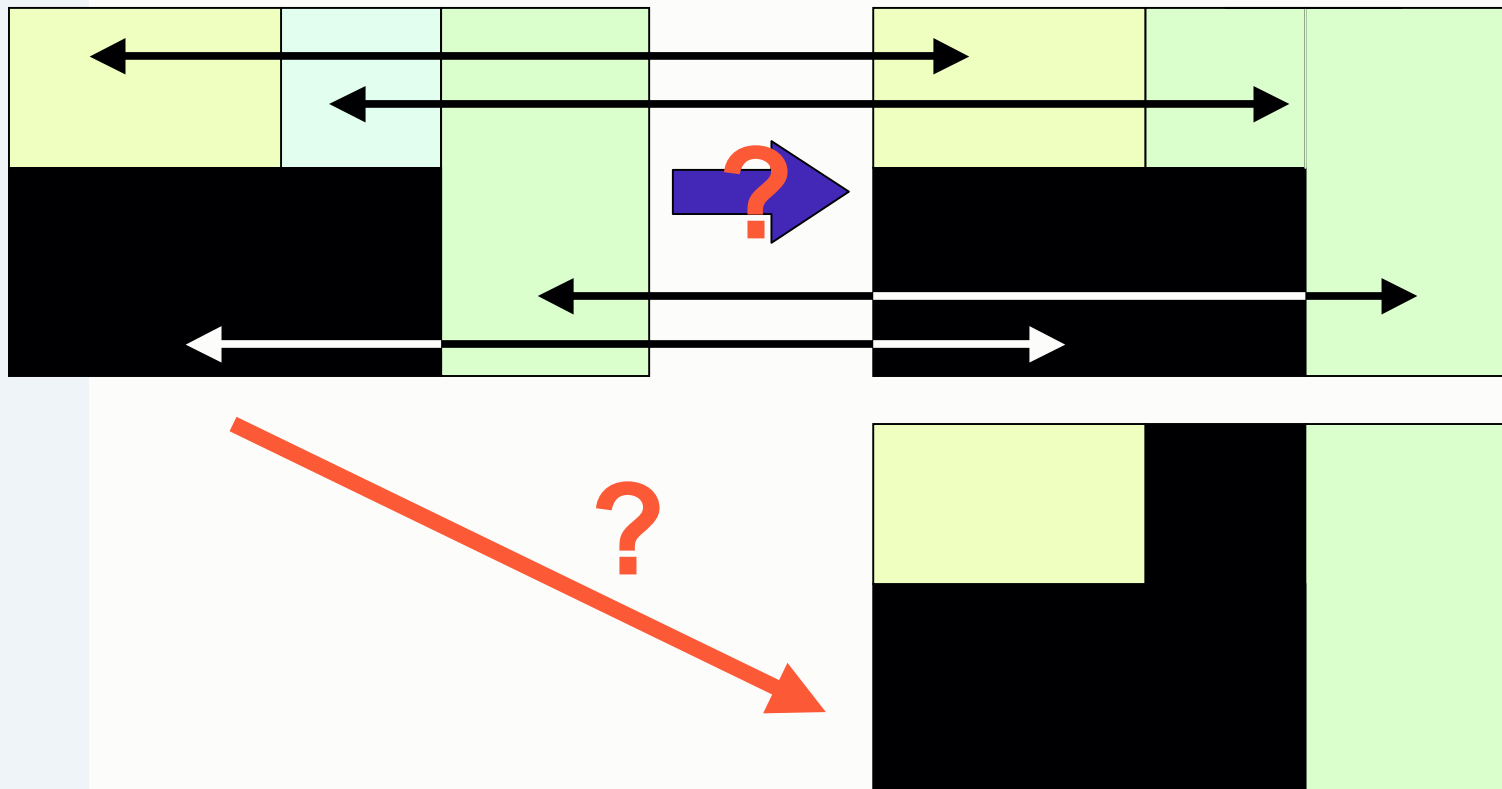


Using Links for Updating: Wrong or Right?

Priority-Table



Solution: Neighbourhood must be analysed at first!



Further Work

- ▶ End 2004 first running prototype for
 - Matching of line and area objects
 - Incremental update for area objects
 - Rule based process control
- ▶ 2005
 - Model generalisation of line objects
 - Roads, water, and railway
 - Migration concept to the new AAA-Model (ATKIS-ALKIS-AFIS)
- ▶ General other work
 - Improvement of the ArcGIS MRDB visualisation
 - Development of multi-scale data analysis tools
 - Automatic verification and hypotheses of updates into larger scales

General Open Questions

- ▶ Different DB's for multi-representations or one DB with different DB-Views?
- ▶ Efficient implementation of an MRDB
 - Efficient storage of explicit links
 - Efficient derivation of links by queries
- ▶ Efficient infrastructure for an MRDB using distributed databases
- ▶ Design of multi-scale operations that take MRDB-structure into account