TOP10SMART

Multi Layer raster data for multi scale maps

SMART = Scalable Multi Allocation Raster Topography

Jan.Clement@wur.nl

ALTERRA
WAGENINGEN UR

Multi Layer raster data for multi scale maps

- Introduction
- Problem statement
- Methodology
- Conclusions
- Questions

ALTERRA
WAGENINGEN UR

Introduction

- Top10NL feature Geodatabase:
- Single features: areas, lines and points
- Area feature classes
  - Terrain, water, roads and houses
- Line feature classes
  - railroads, ditches, nursery trees etc
- Point feature classes
  - Single trees, annotation, signs etc

ALTERRA
WAGENINGEN UR

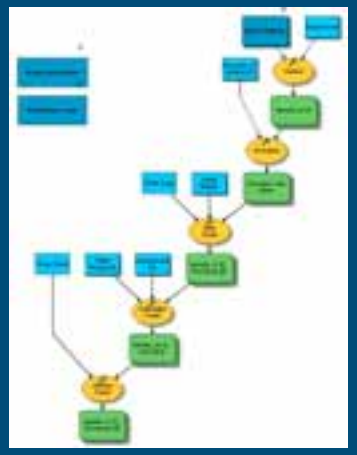
Base mapTop10NL (Westervoort)

ALTERRA
WAGENINGEN UR

Problem

- The problem is performance…
- Drawing features like polygons and lines takes a lot of time by large scales
- No aggregation on the fly

Top10NL to Raster conversion



```
/* CURSOR Top10smart shrink per kaartblad uit te voeren
/*
ASEL %TOP25BLAD_TABELA% INFO
&setvar maantal [extract 1 [show select %TOP25BLAD_TABELA% INFO]]
CURSOR TOPBLAD DECLARE %TOP25BLAD_TABELA% INFO RW
CURSOR TOPBLAD OPEN
CURSOR TOPBLAD FIRST
&do i := 1 &to %maantal%
  &SV BLOK25GEB = %:TOPBLAD.BLOKGEBIED%
  &SV KB25_ID = %:TOPBLAD.T10BLAD_ID%
  &SV TOP25BLAD = %:TOPBLAD.TOP10BLAD%
  &SV XMIN = %:TOPBLAD.XMIN%
  &SV YMIN = %:TOPBLAD.YMIN%
  &SV XMAX = %:TOPBLAD.XMAX%
  &SV YMAX = %:TOPBLAD.YMAX%
  &SV XMIN_EXTEND = [CALC %XMIN% - 1000]
  &SV YMIN_EXTEND = [CALC %YMIN% - 1000]
  &SV XMAX_EXTEND = [CALC %XMAX% + 1000]
  &SV YMAX_EXTEND = [CALC %YMAX% + 1000]
  &SV GEB_MAP = %UITVOER_JB%\GEB%BLOK25GEB%
  &IF NOT [EXISTS %GEB_MAP% -WORKSPACE] &THEN ARC CW %GEB_MAP%
    SETWINDOW %XMIN_EXTEND% %YMIN_EXTEND% %XMAX_EXTEND% %YMAX_EXTEND%
  &CALL DO_BLAD
  CURSOR TOPBLAD NEXT
&END
CURSOR TOPBLAD CLOSE
```

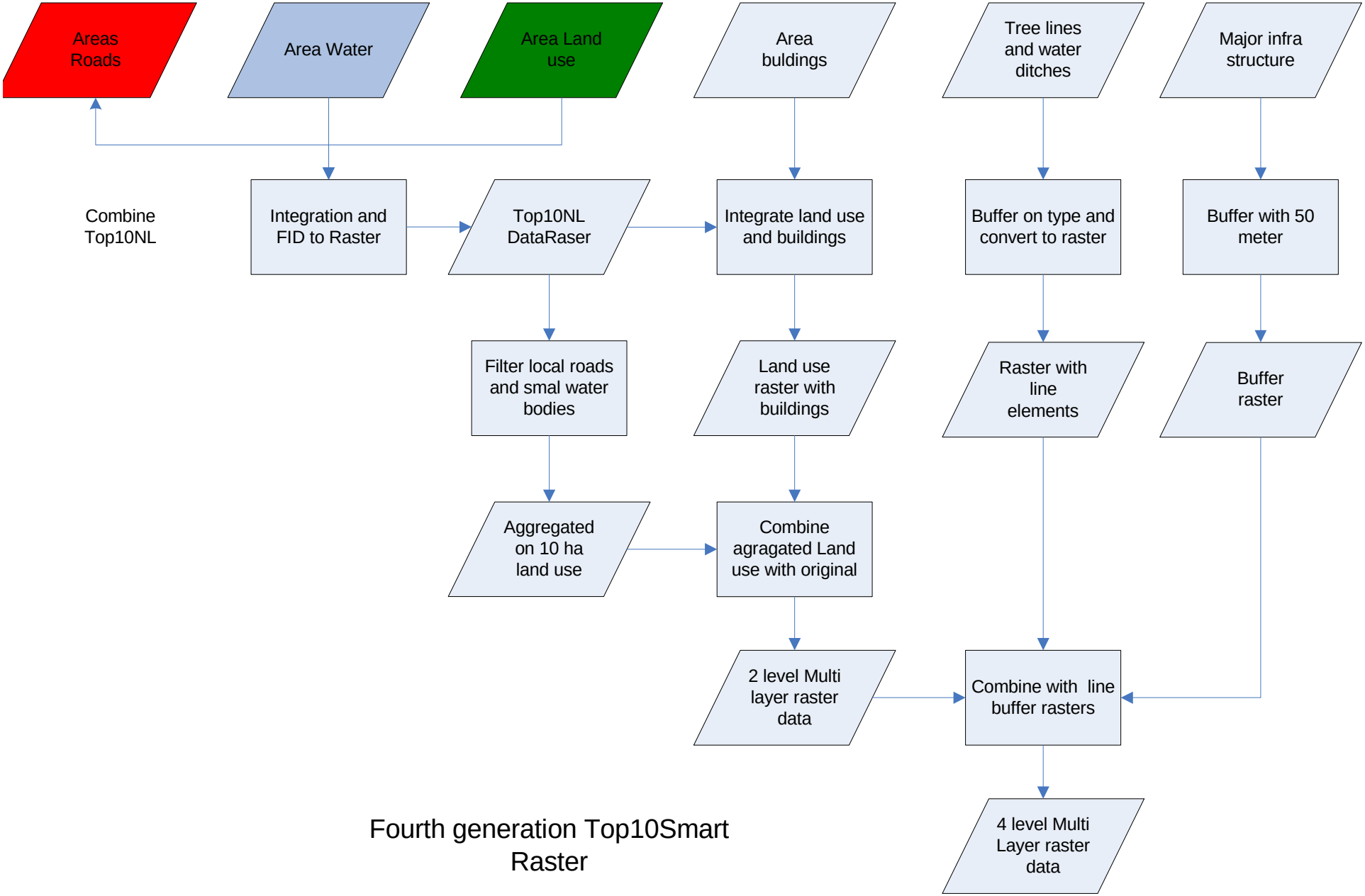
- We used serveral ArcGIS tools like
  - Modelbuilder
  - Python
  - Arcinfo with AML (Buildvat, Shrink, joinitem for large datasets)

ALTERRA WAGENINGEN UR

Methodology

- Integration of the several input Top10NL layers
- Polygon to dataraster conversion 2.5m on FID
- Filter local infrastructure and small water bodies
- Aggregation to 10ha patches with 25m raster
- Zonalmajority of aggregation result with 2.5m dataraster
- Combine the aggregation 2.5m with original
- Add line raster elements to the combine raster
- Add major roads and railway buffers to the combine raster
- Final result: **Multi Layer raster data for multi scale maps**

ALTERRA
WAGENINGEN UR



Fourth generation Top10Smart Raster

ALTERRA WAGENINGEN UR

Integration of the several input Top10NL layers

- Using Model builder ArcMap
- Union
- Dissolve on land use
- Create unique ID from FID

ALTERRA
WAGENINGEN UR

Polygon to dataraster conversion 2.5m on FID

- The combined polygon feature dataset was converted to 2.5m dataraster on unique ID
- a python script using raster tiles
- One output dataraster with 3.5 million records
  - (buildvat in Arcinfo workstation)

ALTERRA WAGENINGEN UR

Filter local infrastructure and small water bodies

- Shrink removed small roads and water bodies from the original dataraster
- The new dataraster was used to generalize land use
- Because no infra and water ditches:
  - Bigger land use patches to start
  - Less noise in the aggregation result
- Procedure was applied with AML in small tiles
  - (python was very slow)

ALTERRA WAGENINGEN UR

Aggregation to 10ha patches with 25m raster

- Tried with model builder but I used AML
- From the cleaned dataraster with no infrastructure and small water bodies a 25m resolution land use map was generated
- The 25m resolution map was generalized (10 ha patches)
- Final output was 2.5m raster using zonalmajority with the 2.5m cleaned dataraster

ALTERRA
WAGENINGEN UR

Combine the aggregation 2.5m with original

- The original 2.5 m raster with 43 land use classes was combined with 7 aggregated land use classes
- Now there are two layers available. Subsequently, two more were added:
  - Top10NL (buffered) line elements were added
  - Major infrastructure with 50m buffer was added
- Colormap attributes scale groups were added

ALTERRA
WAGENINGEN UR

Result

- Multi Layer raster data for multi scale maps
  - Can be used in scales 1:10000 to 1: 250000
  - Very fast drawing
  - Identify tool can be used on each scale
  - Much layer styles are possible
  - Looks great on all scales
- Demonstration

Demonstration Top10SMART

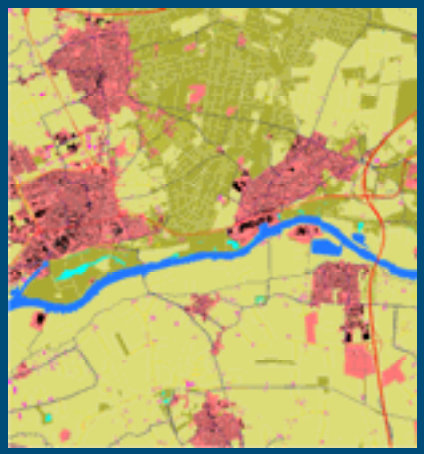
- Background image
- Web mapping

ALTERRA
WAGENINGEN UR

Top10smart of the Netherlands

Multi layer raster

- Definition: grid cells with more than one meaning
  - Aggregated land use map
  - Combination with non-aggregated land-use elements
- Advantages:
  - One grid with many applications
  - Scalable legends
  - Perfect performance with high resolution



ALTERRA
WAGENINGEN UR

Conclusions and remarks

- It is good because..
  - Great performance
  - Great multi scale map resolution
  - On the other hand…
  - It takes much effort to create Multi layer rasterdata
  - Number of legends is unlimited
- Some things did not work out so well and these were..
  - Still need AML in Workstation for some operations
  - Model builder has some limitations (multi output Mapalgabra)

Questions?

Jan.Clement@wur.nl

ALTERRA
WAGENINGEN UR