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Conference 2008 Beijing
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The New Drawing Core State-of-the-Art Vector Graphic With OpenOffice.org

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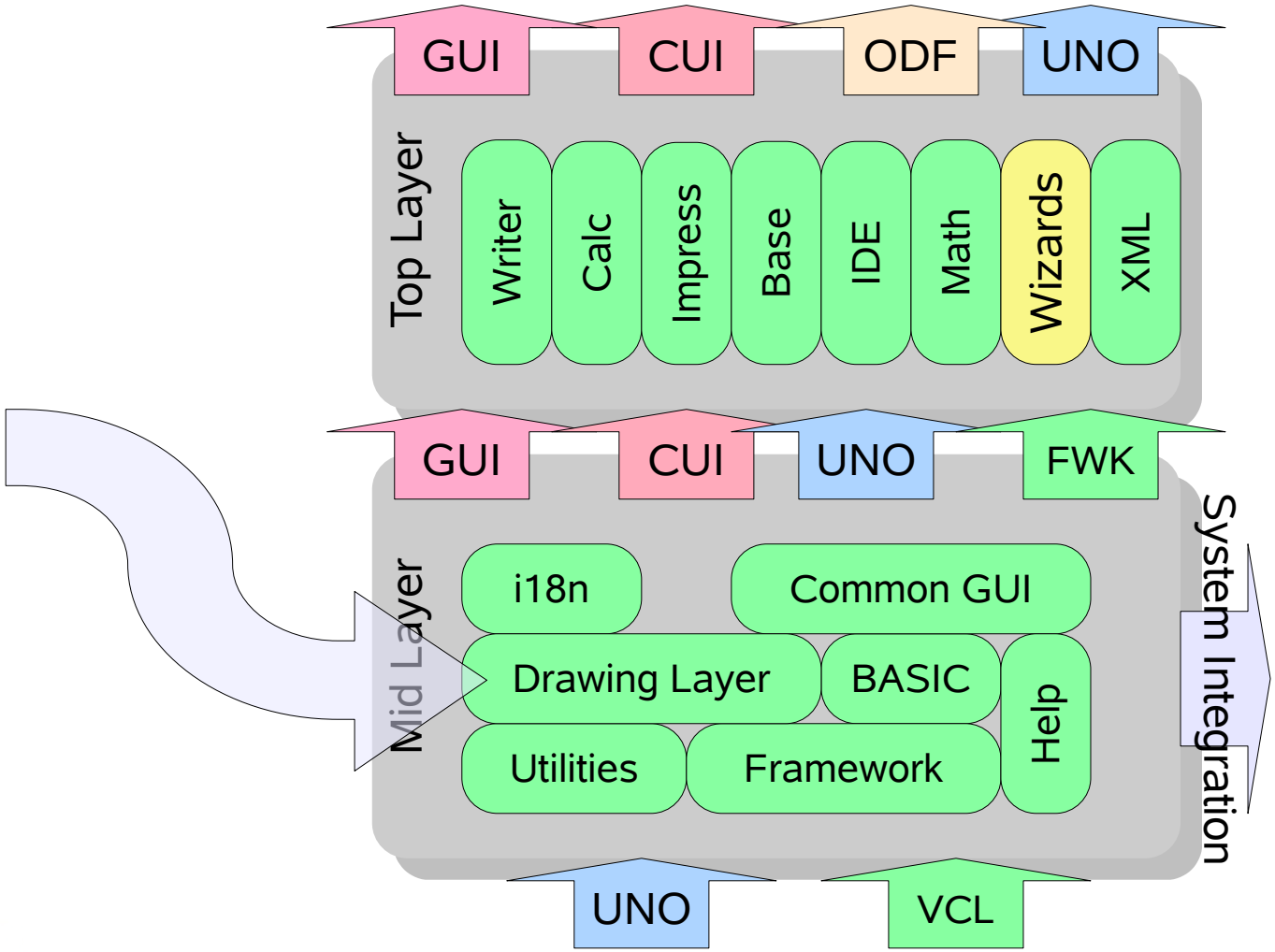
Outline

- DrawingLayer: What is it?
- Why a new DrawingLayer?
- Traits of the New DrawingLayer
- Status of the Rework
- DrawingPrimitives: What are they?
- Demo
- Perspective

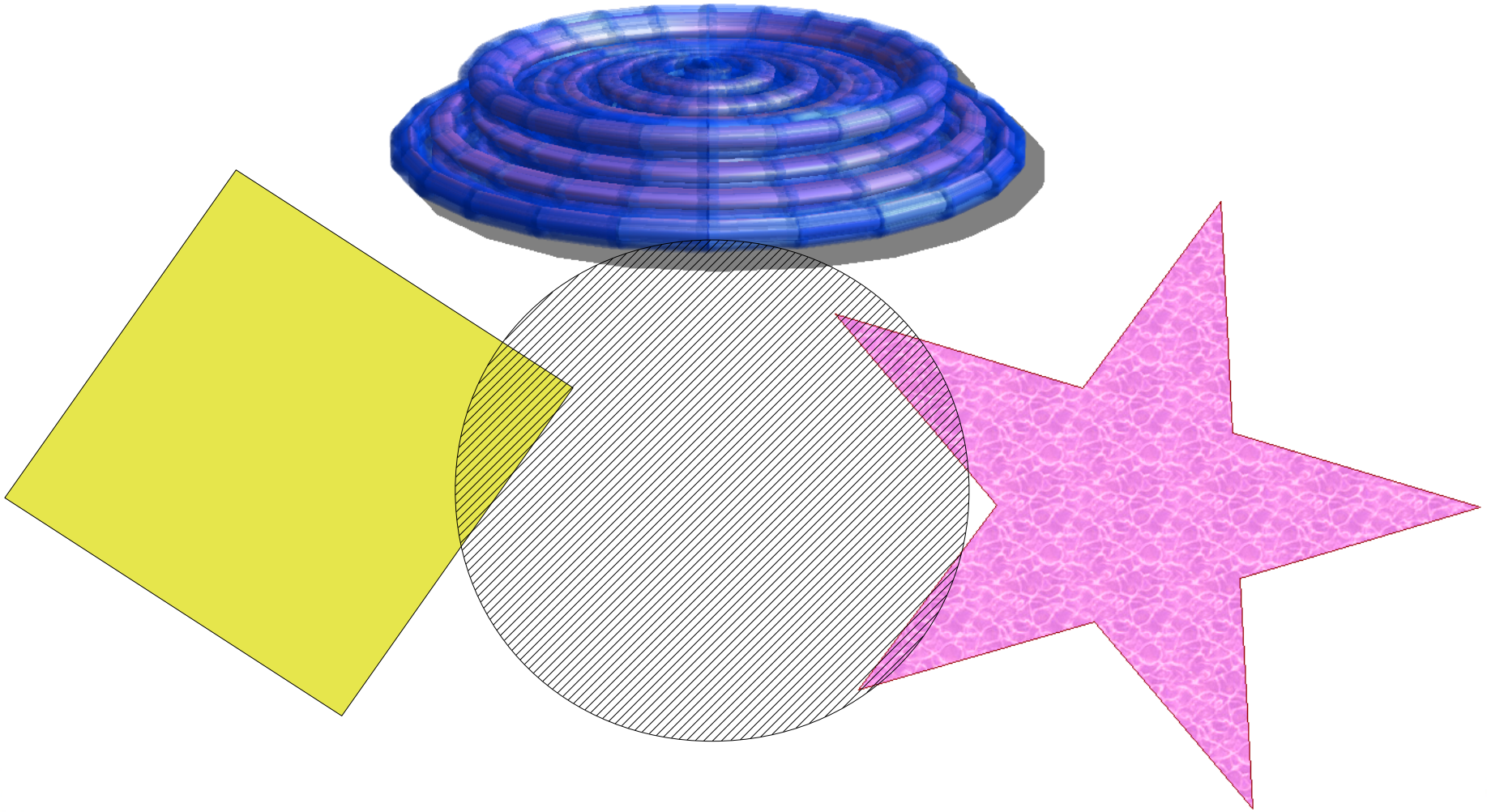
DrawingLayer

- somewhat of a middle layer between rendering subsystems and application cores
- used by all of OpenOffice.org's applications: Draw/Impress, Chart2, Calc, Writer to view & control these shapes
- shared application trunk for those pesky 'Draw Shapes'

(Some) OOo Architecture



DrawShapes



Why a New DrawingLayer?

- graphics requirements are evolving steadily
- the old DrawingLayer is insufficient for that
- it is difficult to maintain
- it is very hard to extend
- no separation between model and view
- tight coupling with application code
- and with system layer code

Traits of New DrawingLayer

- allowing hierarchy of model objects
- extracting common functionality into tooling libraries
- extracting view into renderers
- decoupling data structures from algorithms
- the migration strategy is guided by:
  Backward Compatibility

Additional Benetfits

- important information is not lost too early
- which also helps to improve the performance because algorithms have the big picture

  “the forest is more than a number of trees”
- finally allowing complex transformations of the view
  - perspective
  - shearing
  - gradients/texturing

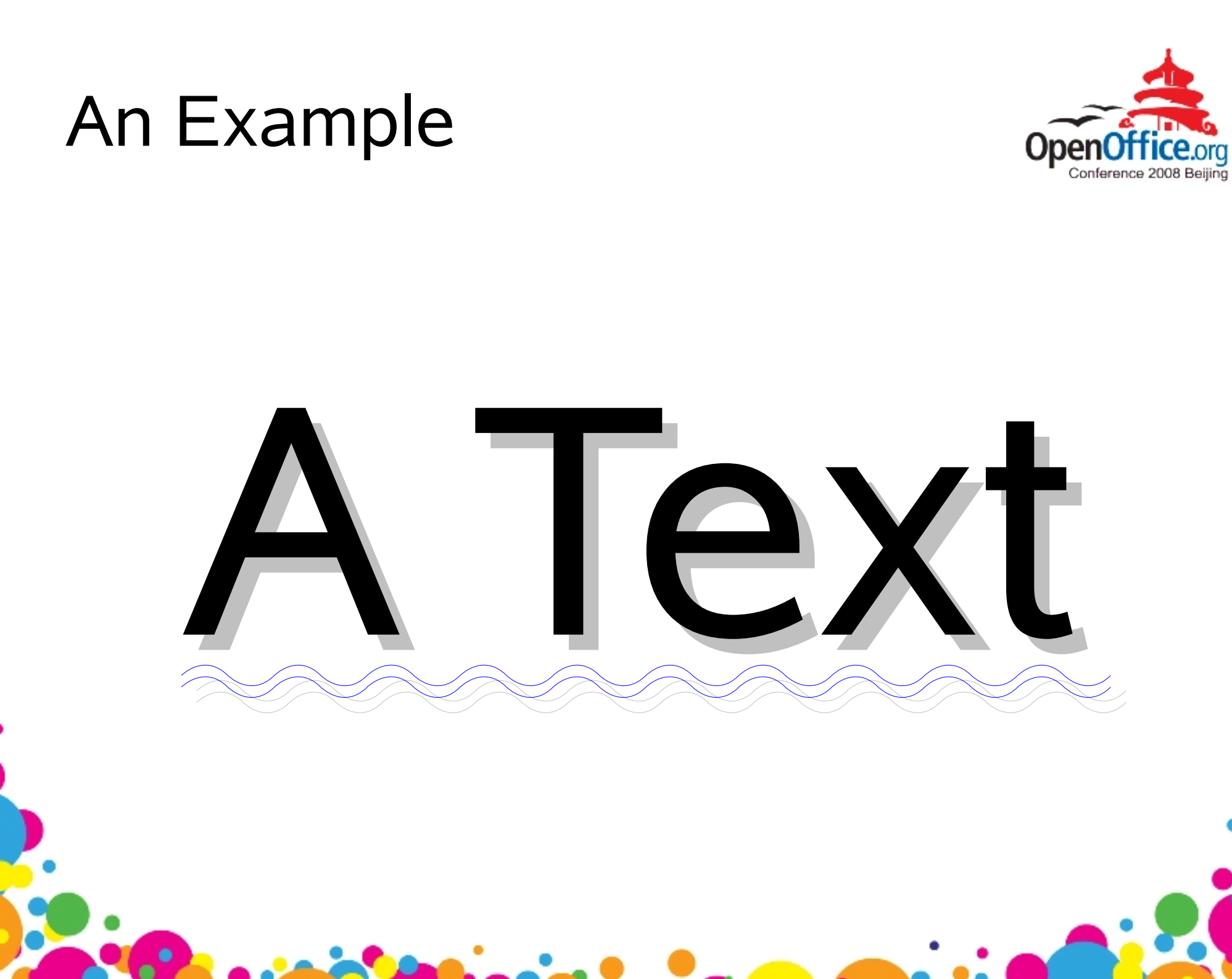
History of the Rework

- CWS aw024 (2004-2005)):
  - reworked paint handling
  - introducing View/Object/Control into the DrawingLayer
  - start extracting helper code into own libraries
- CWS aw033 (2005-2008):
  - DrawingPrimitives
- CWS aw057 (2008):
  - Fixing Regressions
  - Removing obsoleted code

DrawingPrimitives?!

- represent the look of the model objects
- complex DrawingPrimitives are based on simpler DrawingPrimitives
- this hierarchy mirrors the hierarchy of model objects
- DrawingPrimitives can be decomposed

An Example



An Example (cont.)

- the animation
  - with properties like speed, path, etc.
- the text
  - with properties like color, font, BiDi, locale
- the decoration
  - double waveline below
    - with properties like line thickness, color, amplitude, wavelength

Core Primitives

- polypolygon with color
- hairline
- simple text
- bitmaps
- a metafile
- ...

  there is no fixed set!

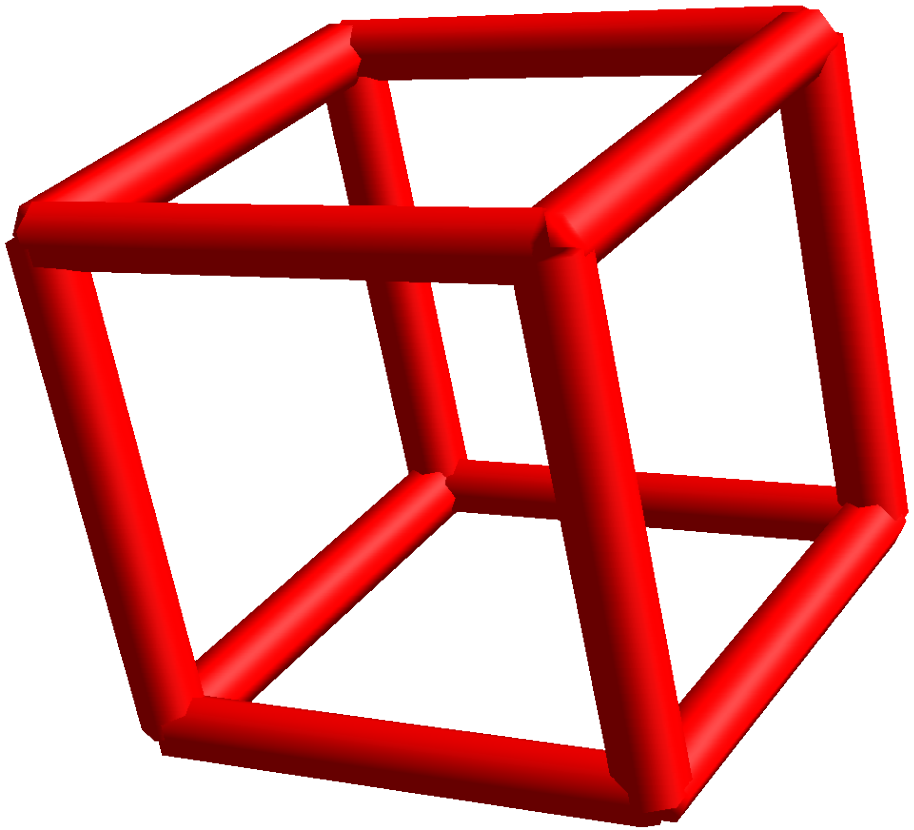
Benefits

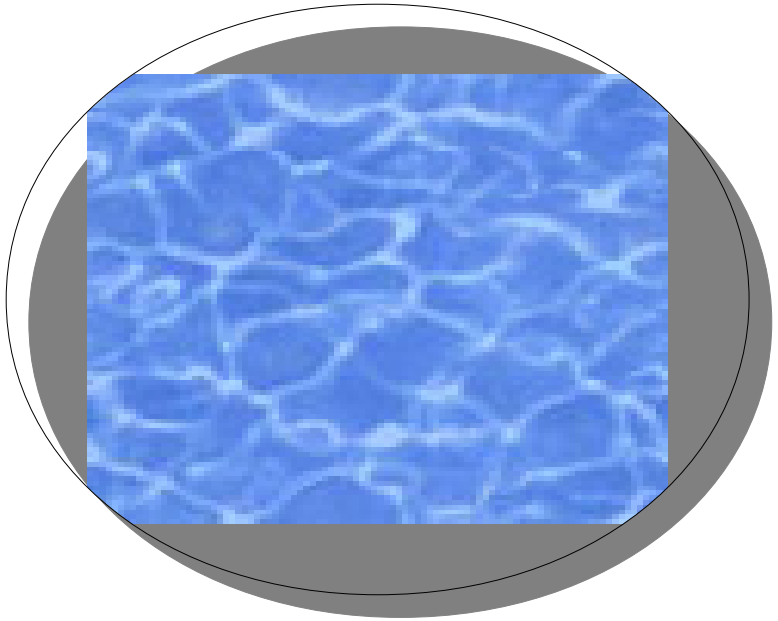
- allows excellent backward compatibility
- fixes many dead ends / missing features / bugs that showed the limits of the old code
- makes new features affordable that would have been prohibitively expensive before (both performance and effort-wise)
- allows major performance improvements
- same approach is used for 3D

Decomposition Details

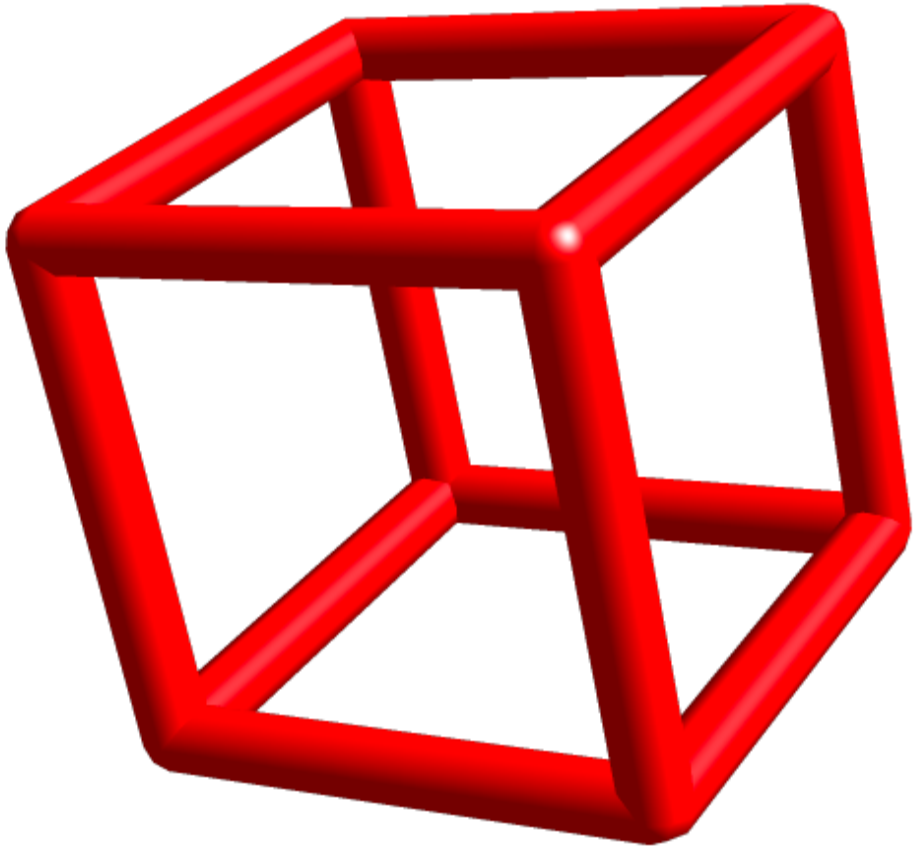
- two kinds of decompositon:
  - view independent (e.g. filled rectangle →polygon)
  - view dependent (e.g. hair line → AreaPolygon)
  - ➔ allows the visually best rendering
- only decompose into Primitives that are more *simple*
- ➢ Note: the toplevel primitive from each model must be view independent

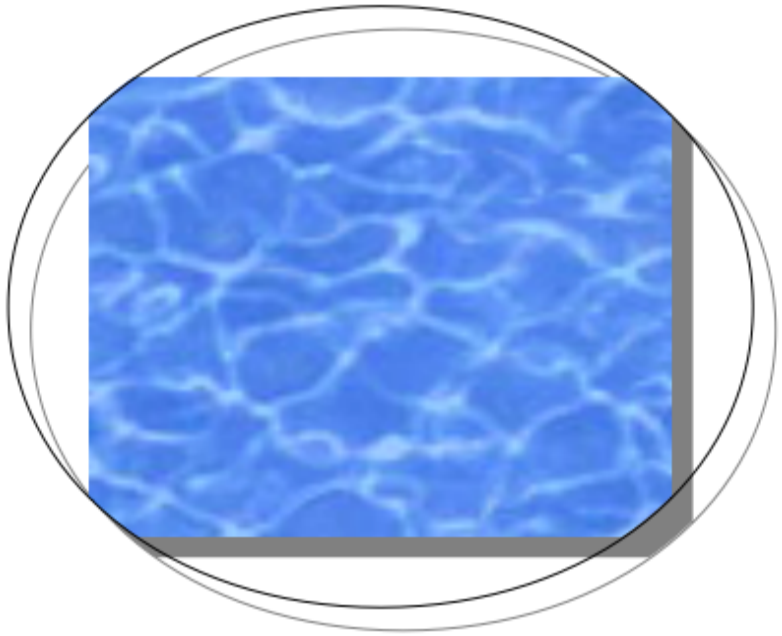
Demo (before)





Demo (after)





Where Are We?

- the major rework has been done
- many minor bugs and problems like missing features or dead ends are gone for good
- very good backward compatibility
- anti-aliasing can be enabled
- rendering is much more correct (“round circles”, correct shadows)

What's Up Next?

- 3.1 will have new DrawingLayer handle:
  - hit testing and interactions
  - full repaints and partial repaints
  - pages, grids and previews
- DrawingPrimitives can potentially be used in all places where MetaFiles are still needed:
  - slideshow
  - PDF-export, printing and flash export
- adding UNO access to base DrawPrimitives

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Thanks!

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