

evas filters & masks

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Masks



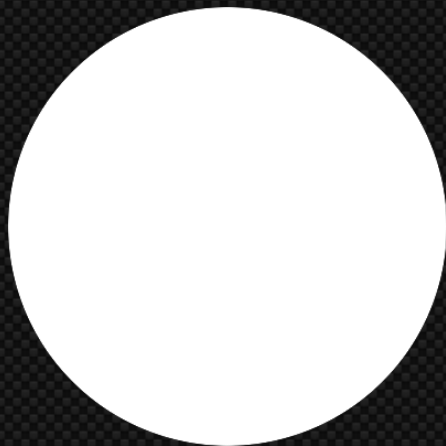
Masking

- Just like clipping but with an image
- Alpha layer used as mask
 - R, G, B channels unused
 - Object color is used like with rectangles (multiply)

Masking: HOWTO

- Same as clip:
 - C: `evas_object_clip_set`
 - EDC: `clip_to`
- Valid clippers: Rectangles & Image objects
 - C: `evas_object_image_add`
 - EDC: `RECTANGLE`, `IMAGE`, `PROXY`

Examples



kodim23



Masks of masks?



Masks of masks?



Masks of masks?

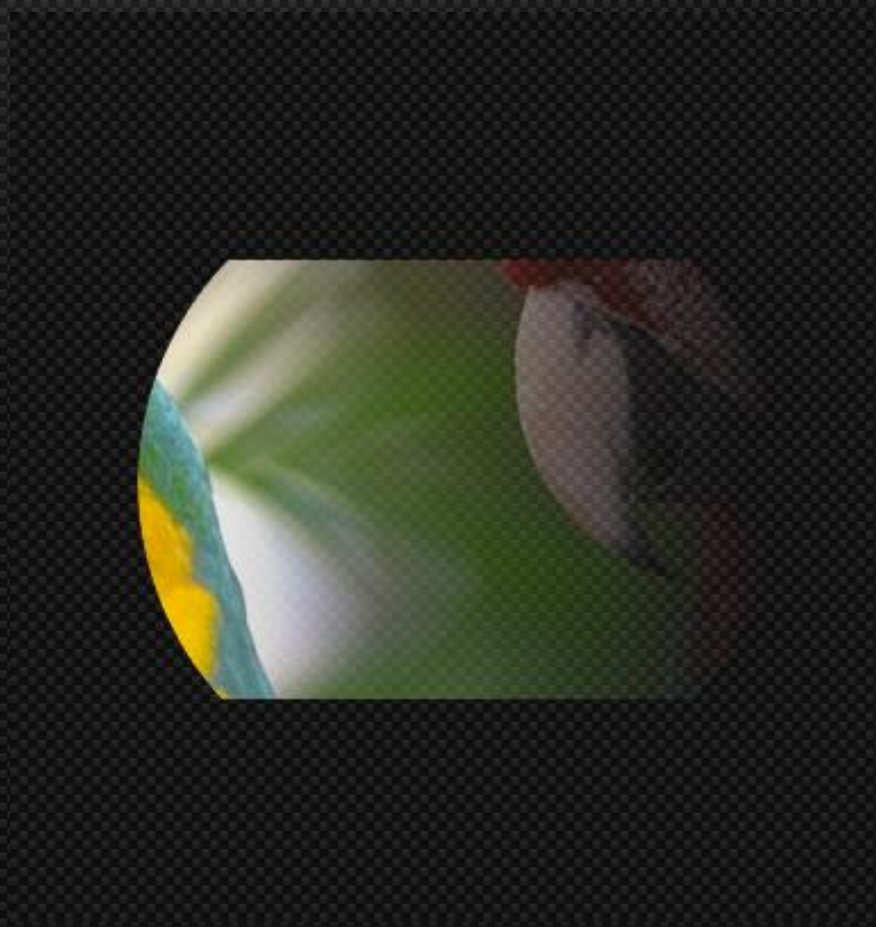


Masks of masks!



- Multiply alpha channels only

Example



Gotchas

- Performance considerations
 - Internal steps to use masking
 - Create mask surface
 - Render (scale) image to surface
 - SW only: extract alpha channel
 - Multiply mask alpha by object pixels
 - GL has one optimization
 - In the proper conditions, performance is great

Performance

- Problem:
 - Masking performance can be slow
 - Rendering image to draw surface, copy to alpha surface (SW), read from surface
- Solution:
 - GL is very good at scaling
 - Use original image, scale on-the-fly, read only alpha

Performance

- Conditions
 - GL engine (ELM_ACCEL=gl)
 - Simple image object
 - Filled or fill = image size
 - No border
 - Only one mask (no mask of mask)
- → Scaling on the fly

And Tizen?

- From Tizen 2.3.1
 - Gear S2, used for animations mainly



Filters



Motivations

- Shiny & fancy **text** effects
 - Replace old SHADOW, GLOW, etc...
 - Animated
- Similar to:
 - HTML/CSS (font-shadow)
 - SVG filters
 - Photoshop

CSS font-shadow



```
color: #fff;  
text-shadow: 0 0 5px #fff, 0 0 10px #fff, 0 0 15px #fff, 0 0 20px #ff2d95,  
0 0 30px #ff2d95, 0 0 40px #ff2d95, 0 0 50px #ff2d95, 0 0 75px #ff2d95
```



```
color: #fff;  
text-shadow: 0px -1px 4px white, 0px -2px 10px yellow,  
0px -10px 20px #ff8000, 0px -18px 40px red;
```



```
text-shadow: 0px 1px 0px #999, 0px 2px 0px #666, 0px 3px 0px #777,  
0px 4px 0px #666, 0px 5px 0px #555, 0px 6px 0px #444,  
0px 7px 0px #333, 0px 8px 7px #001135
```

Cool effects, but only series of blurs

Source:

http://www.midwinter-dg.com/permalink-7-great-css-based-text-effects-using-the-text-shadow-property_2011-03-03.html

Text effects

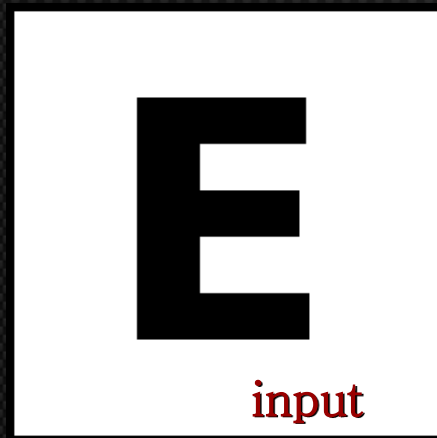
- Shadow, glow, contour, emboss, etc...
- Various colors
- Various sizes (eg. blur radius)

Design concepts

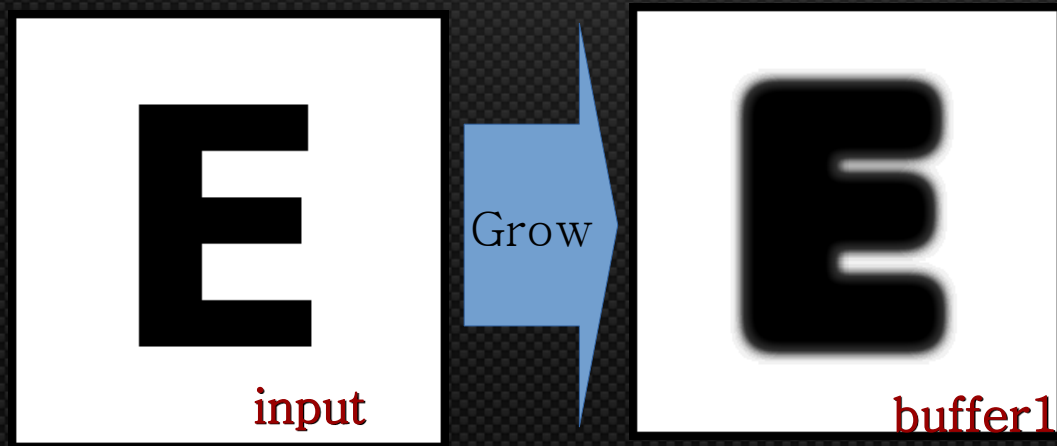
- Photoshop in real-time (Okay, maybe not all of Photoshop...)
- Multiple layers
- Combined effects
- Scripted



Buffer & operations



Buffer & operations



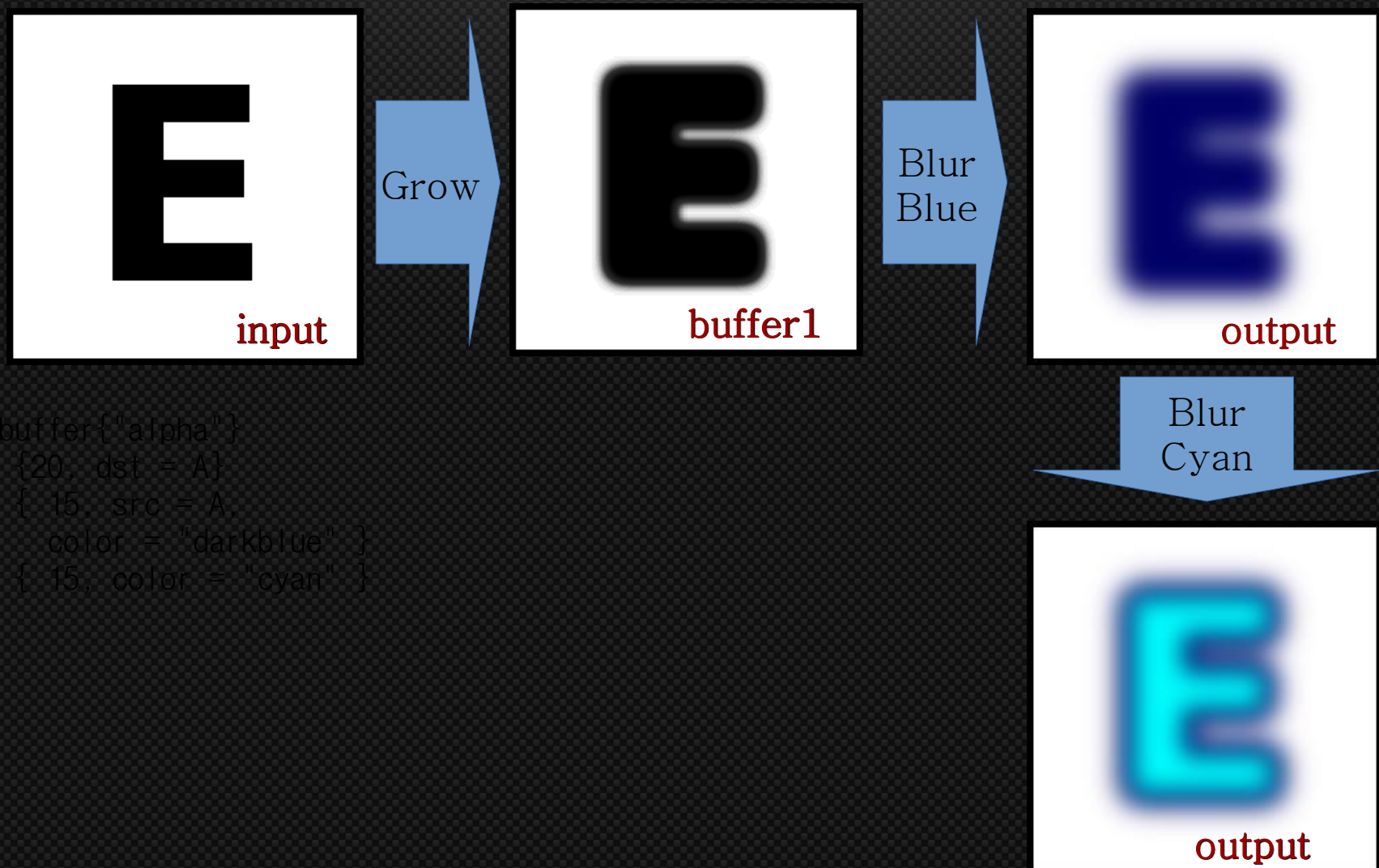
```
A = buffer{"alpha"}  
grow {20, dst = A}
```

Buffer & operations

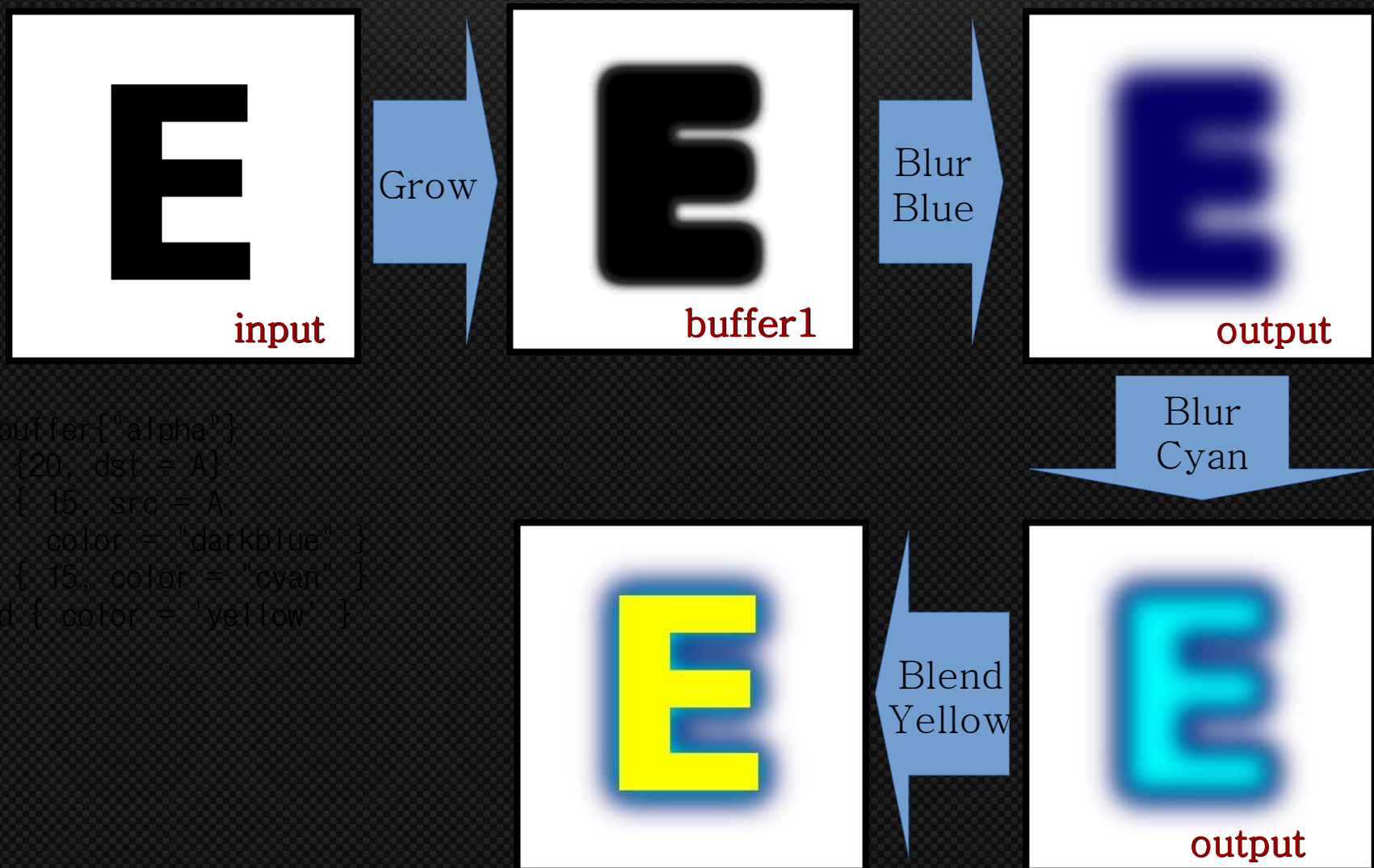


```
A = buffer{"alpha"}  
grow {20, dst = A}  
blur { 15, src = A,  
      color = "darkblue" }
```

Buffer & operations

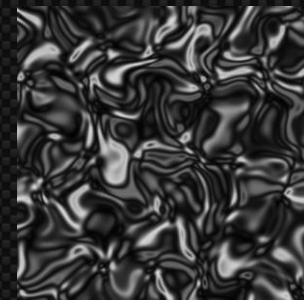
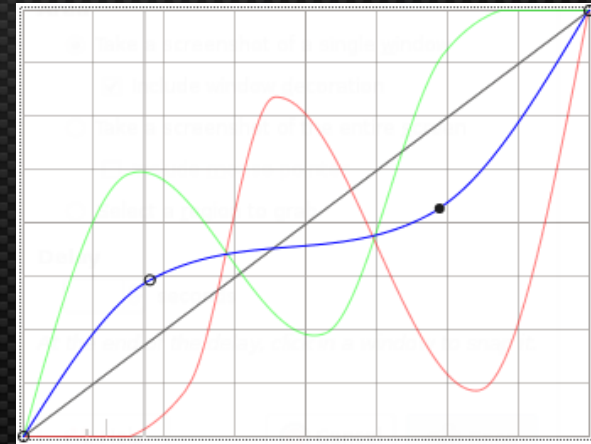


Buffer & operations



Base functions

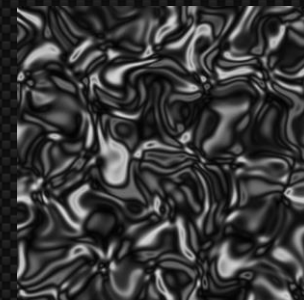
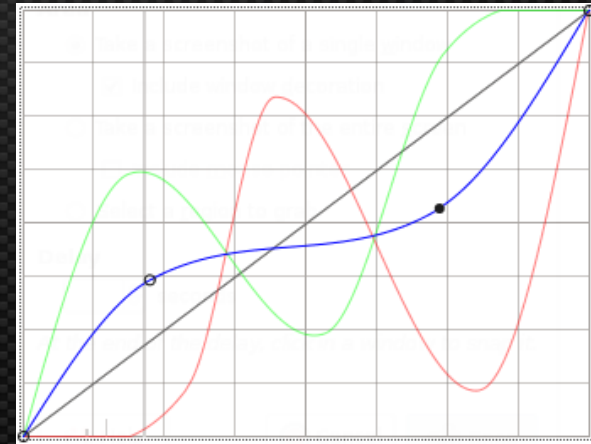
- Blend
- Blur
- Color curves
- Grow
- Mask ($A \cdot B$)
- Bump map
- Displacement map



Raster + Bump map

Base functions

- Blend
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Raster + Displacement map

Current status

- TEXT and IMAGE support
 - C APIs with EO only: Efl.Gfx.Filter (BETA)
 - filter_program_set()
 - filter_source_set()
 - **Stable** EDC API
- **No TEXTBLOCK support at this point**
 - This can actually be *quite hard* to implement

Performance

- Few ms *on desktop* for a TEXT object
 - But final output is cached, rarely redrawn
 - Still work to do to optimize redraws

Future plans

- OpenGL acceleration
 - Implement basic filters with shaders
 - Implement buffer system based on FBOs
- Fix API quirks
 - Some filters work only with certain buffer types (alpha vs. rgba)
 - Some functions
 - Add more state information (font geometry)
- Implement GUI editor
 - → @zmike actually started working on one

Future plans

- Implement more base filters
 - For IMAGES
 - Convolutions, color conversions, etc...
 - SVG filters
 - *Vector graphics, anyone?*
- Partial rendering / better caching

demo

Q&A