Taking LibreOffice Mobile

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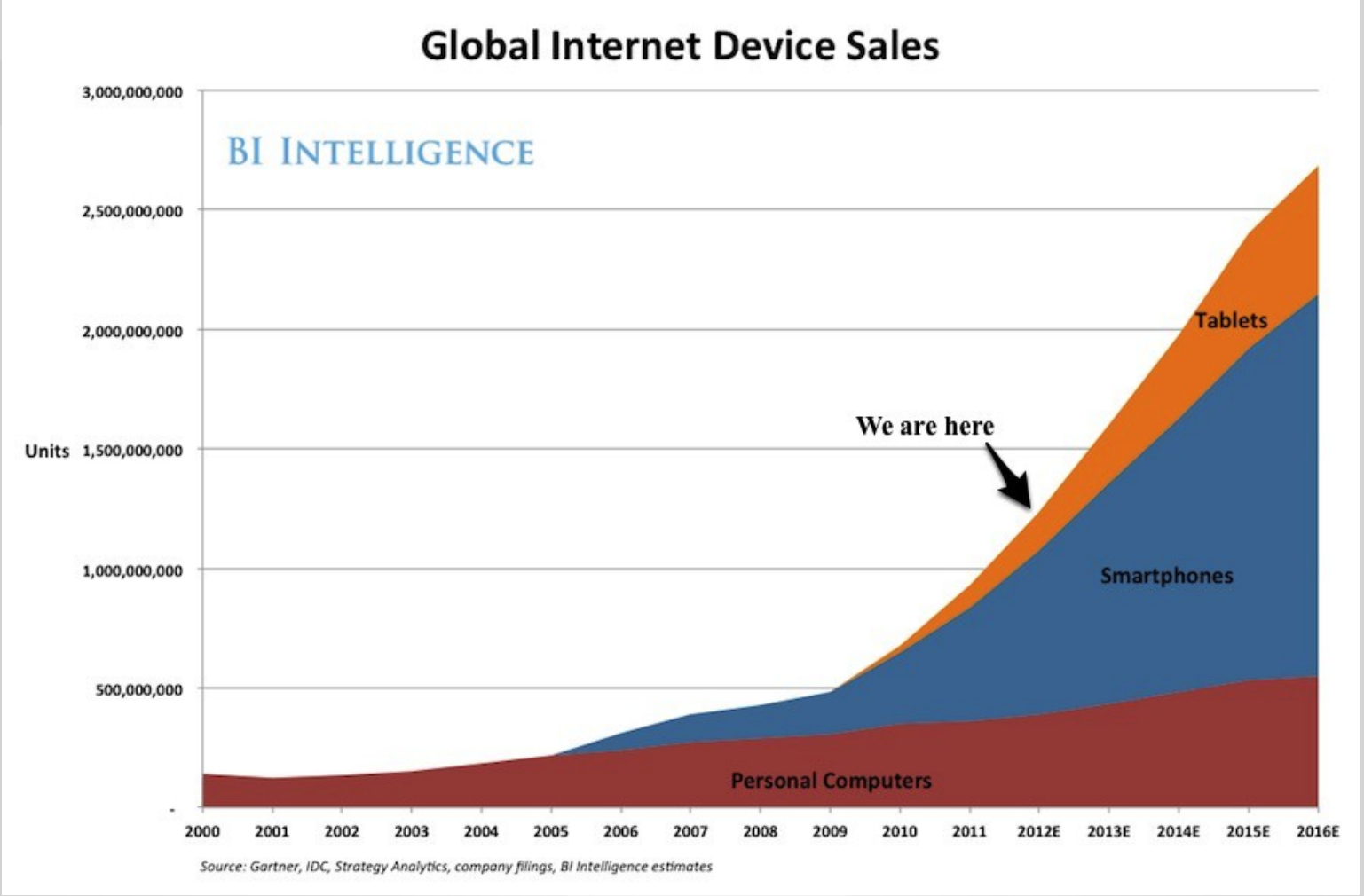
Why Mobile?


Global Internet Device Sales
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Units
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We are here
Tablets
Smartphones
Personal Computers
2000
2001
2002
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2014E
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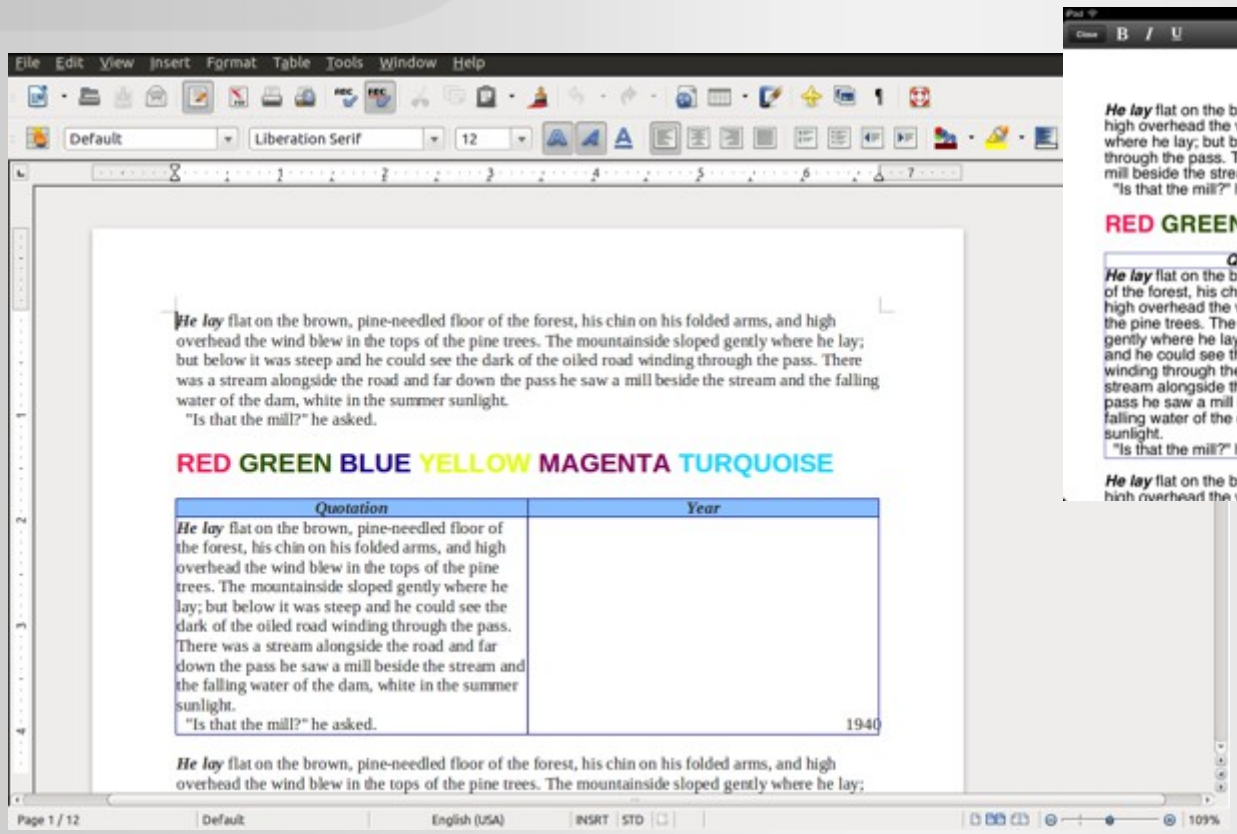
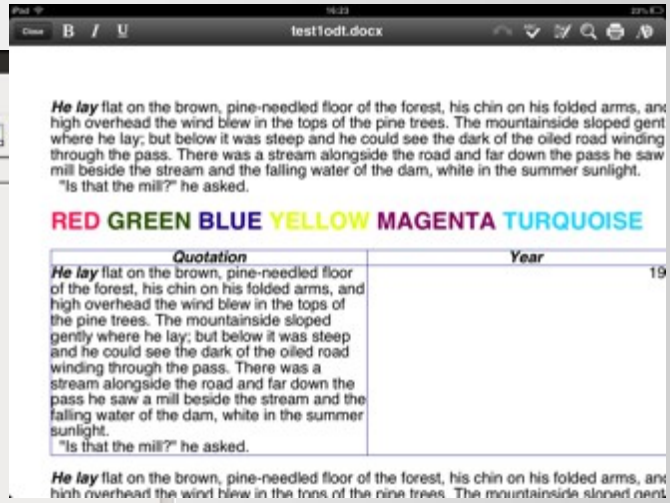
2016E
Source: Gartner, IDC, Strategy Analytics, company filings, BI Intelligence estimates

What does it means?

Turn Desktop application

Into Mobile app





Interoperability

- Another important key to successful penetration

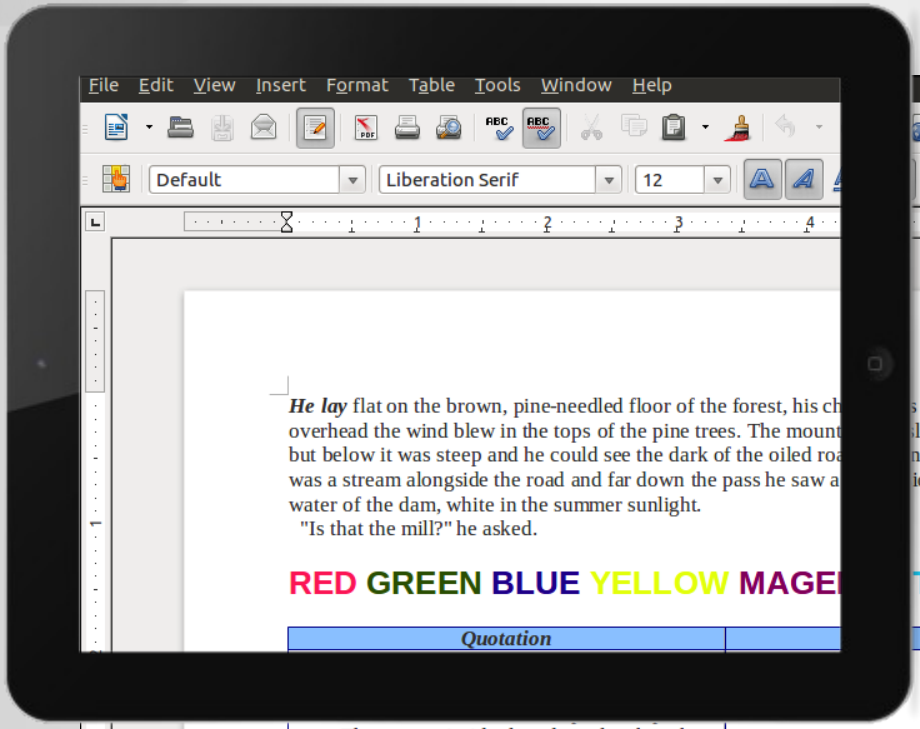
More on this in a later session by Adam Fyne

Agenda

- Mobile devices vs. Desktops
- LibreOffice mobile architecture
- Gestures and rendering optimizations
- What still needs to be done?

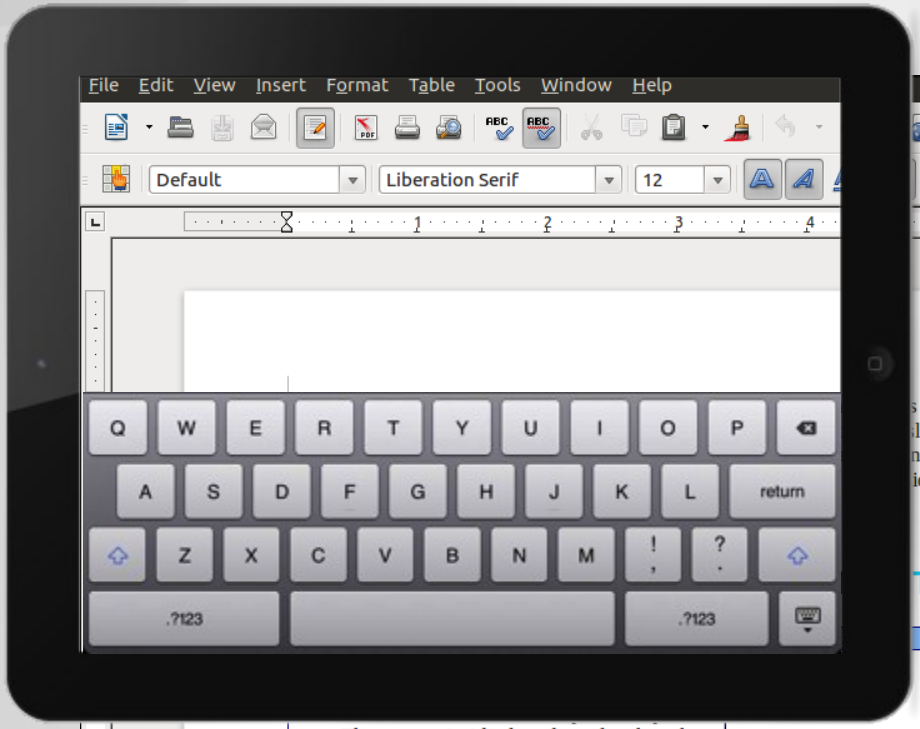
Smaller screen

- Smaller resolution & higher DPI -> Less real estate



Smaller screen

- Virtual keyboard makes things worst



s folded arms, and high
loped gently where he lay;
ng through the pass. There
ide the stream and the falling

TURQUOISE

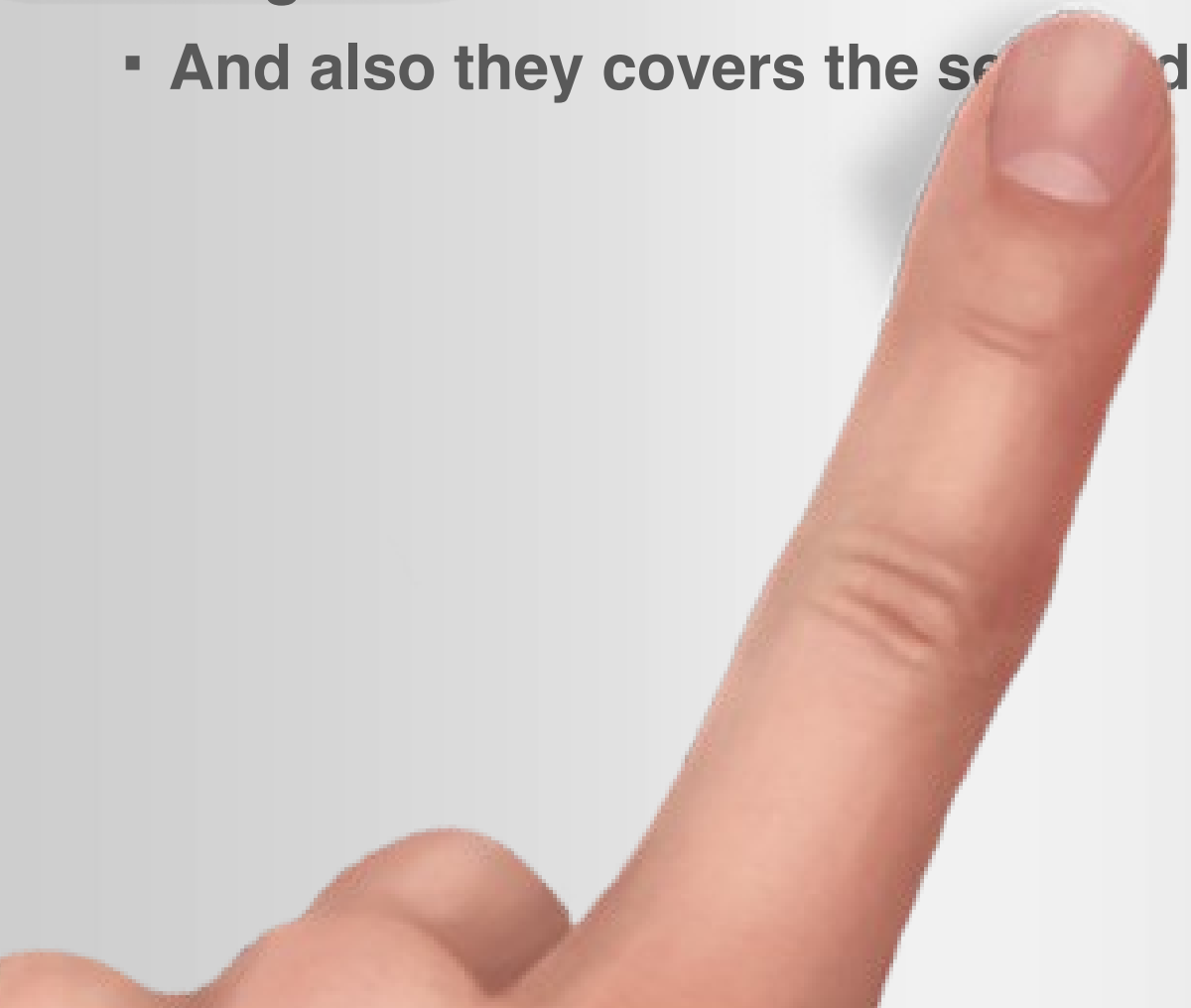
	Year
trees. The mountainside sloped gently where he lay; but below it was steep and he could see the dark of the oiled road winding through the pass. There was a stream alongside the road and far down the pass he saw a mill beside the stream and the falling water of the dam, white in the summer sunlight. "Is that the mill?" he asked.	1940

He lay flat on the brown, pine-needled floor of the forest, his chin on his folded arms, and high overhead the wind blew in the tops of the pine trees. The mountainside sloped gently where he lay;

Page 1 / 12 | Default | English (USA) | INSRT | STD | 109%

Touch screen

- Fingers are **BIGGER** than mouse pointers
- And also they covers the sc d area



Device HW

- **Desktops are work horses**
  - Powerful CPU
  - Lots of memory

- **Mobile devices are efficient**
  - Power Saving

To summarize…

- Mobile – Desktop differences requires us to think of:
  - New visual layout
  - New views behavior
  - Touch friendly UI components
  - Better performance
  - Mobile application shell

Demo

LibreOffice on my iPad

Features included in our iPad prototype:

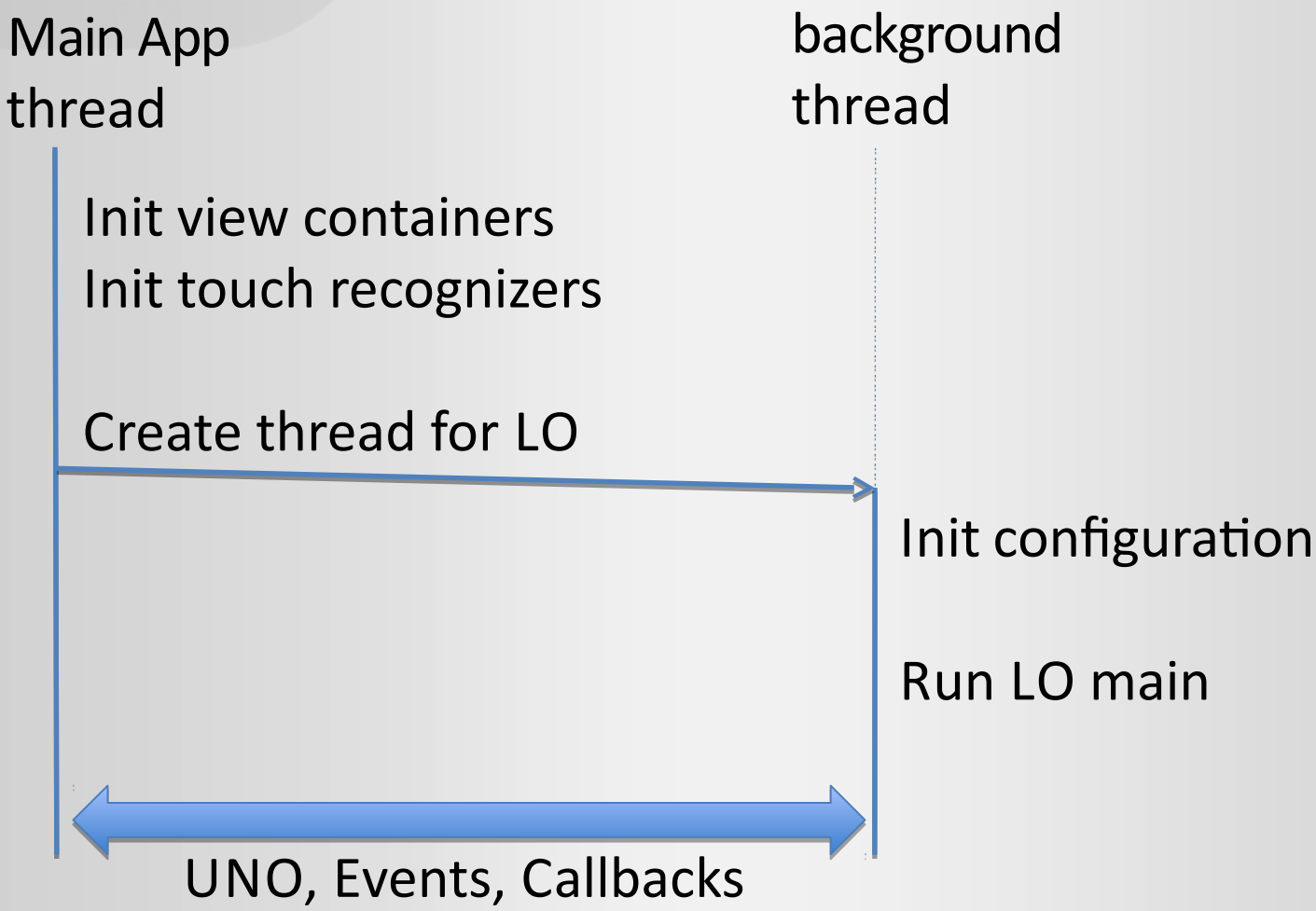
- View and Edit office files
- Navigating with gestures
- Find text in document
- Copy selection to device clipboard
- Open files from cloud storage
- Double tap for zoom
- Define selection – thesaurus
- Magnification glass

Experimental Mobile app

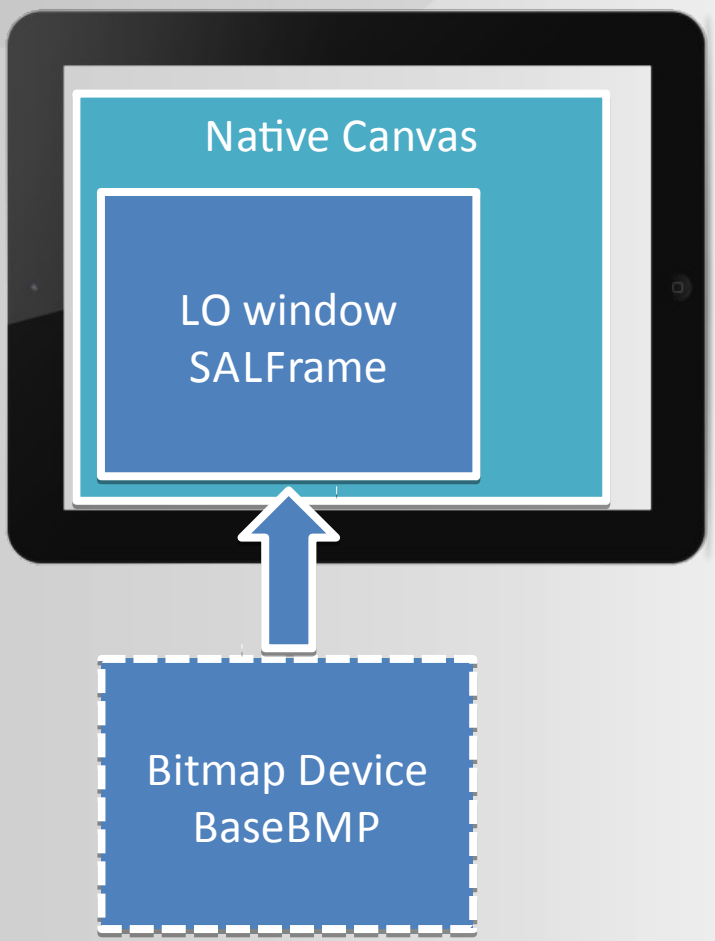
Background on previous work of others:

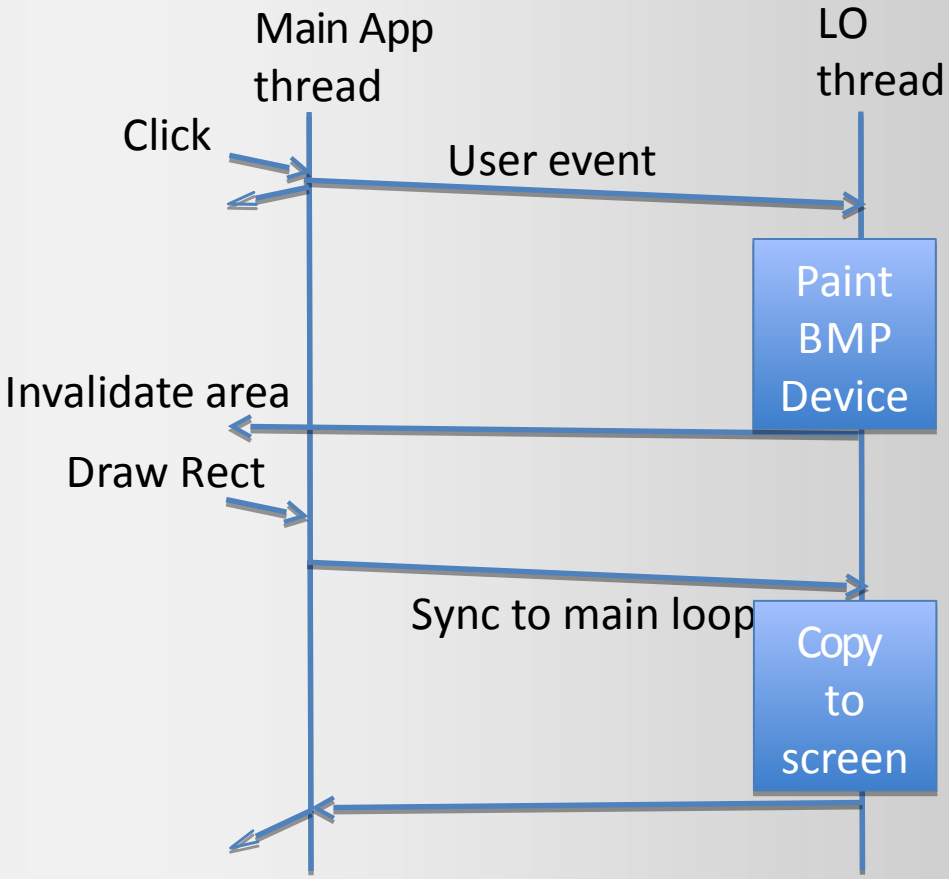
- Porting LO code to ARM architecture
- Integrate iOS and android toolchain in the make scripts
- Rendering pages vs create desktop context

Creating Desktop context



Off-screen rendering





How to implement native app experience?

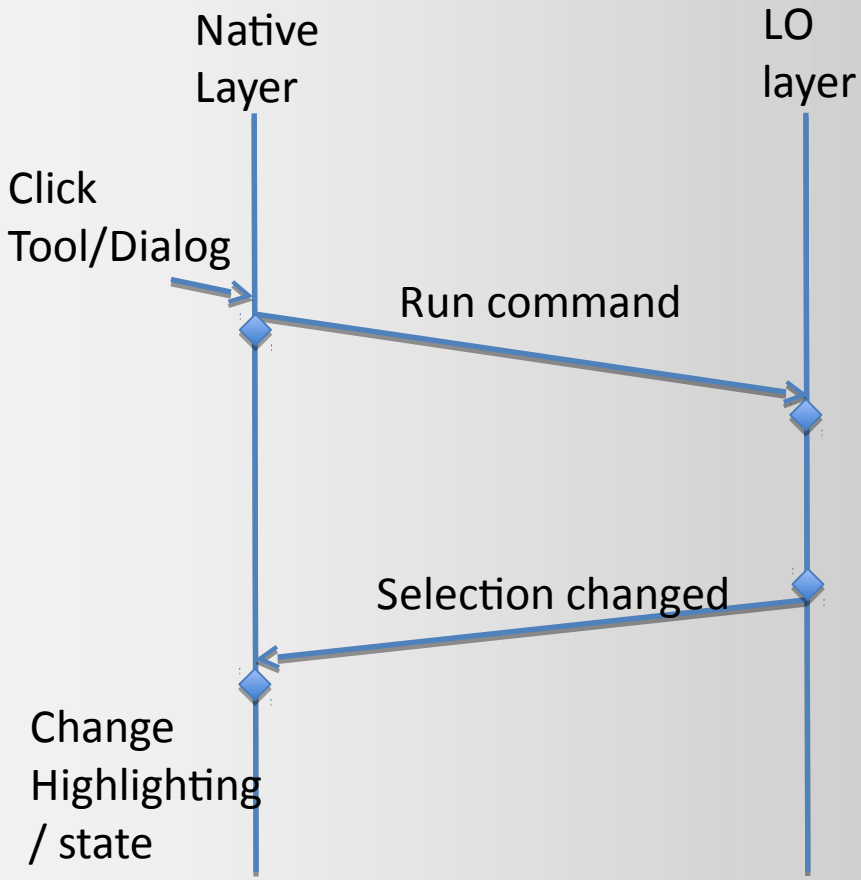
- Native UI elements
- Adapted UI flow

Integrating UIs

- Using native OS UI elements

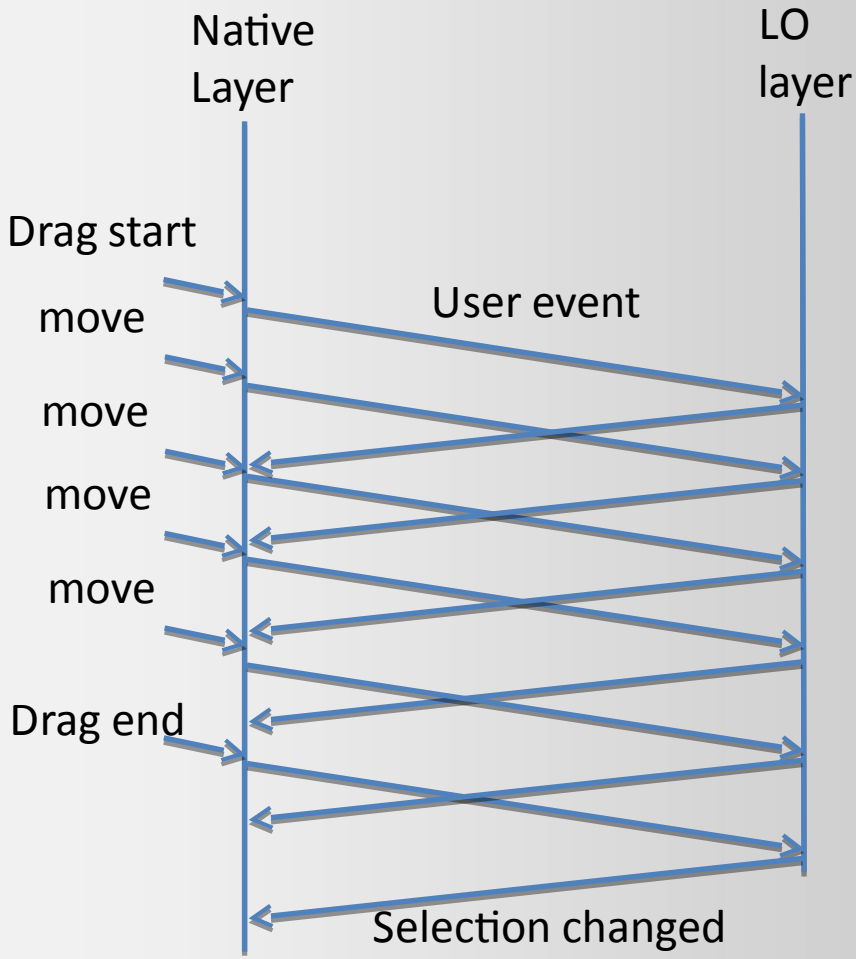
Layers interaction

- **Light interaction**
  - Tool bar
  - Context menu
  - Dialogs



Layers interaction

- **Heavy interaction**
  - Scroll bar
  - Text select



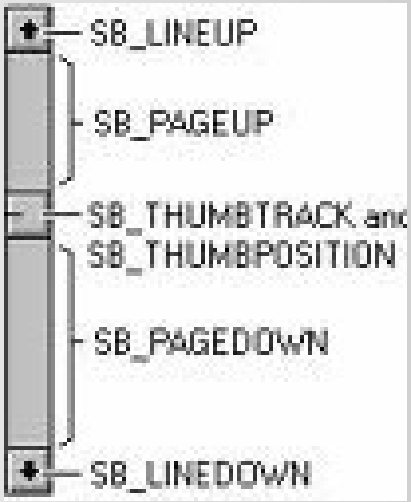
How to implement gestures?

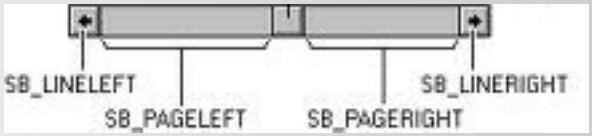
- **Events**
- **How to make it smooth? – The importance of fast rendering**
  - High FPS
  - Low Lag

Some implementations samples

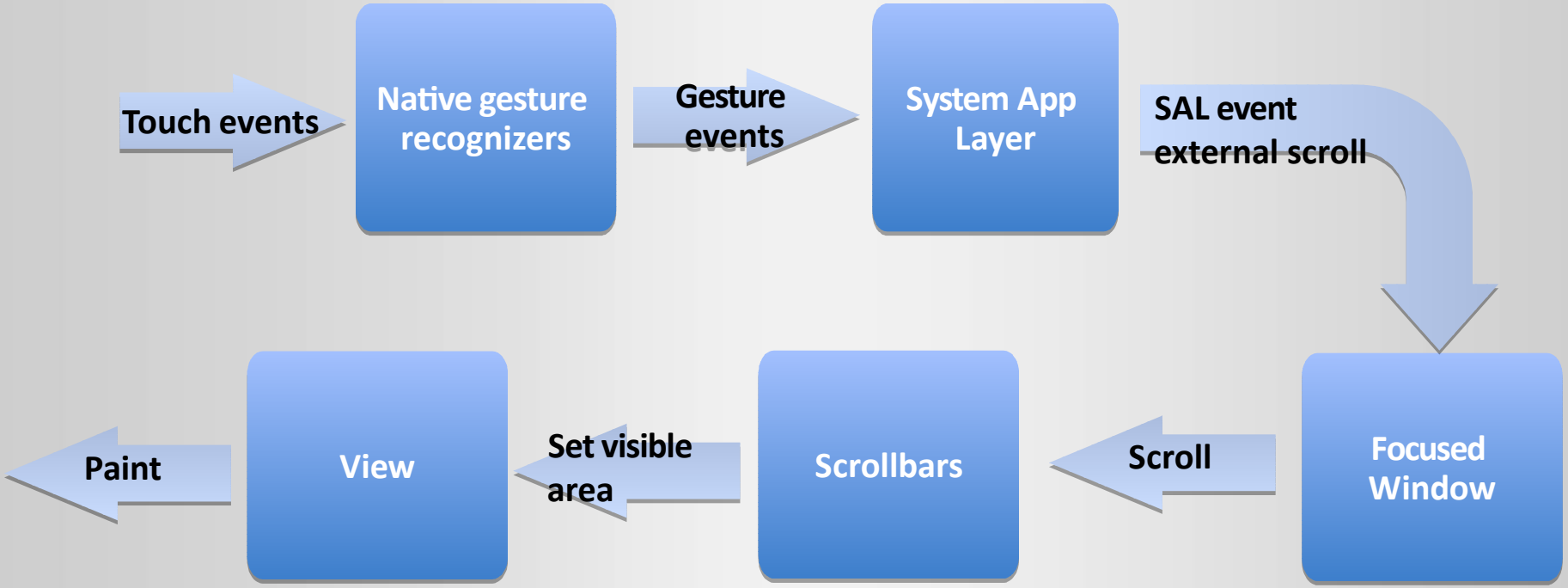
Pan gesture

- Pan is different than scroll
- Just follow my finger



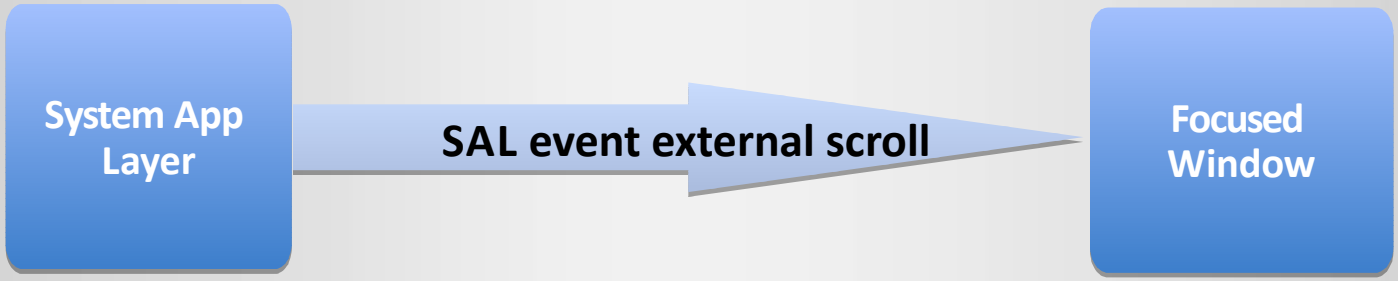


Pan gesture


Touch events
Native gesture recognizers
Gesture events
System App Layer
SAL event external scroll
Focused Window
Scroll
Scrollbars
Set visible area
View
Paint

Pan gesture

- Scrollbars are using lines granularity
- We need to make it works in pixels



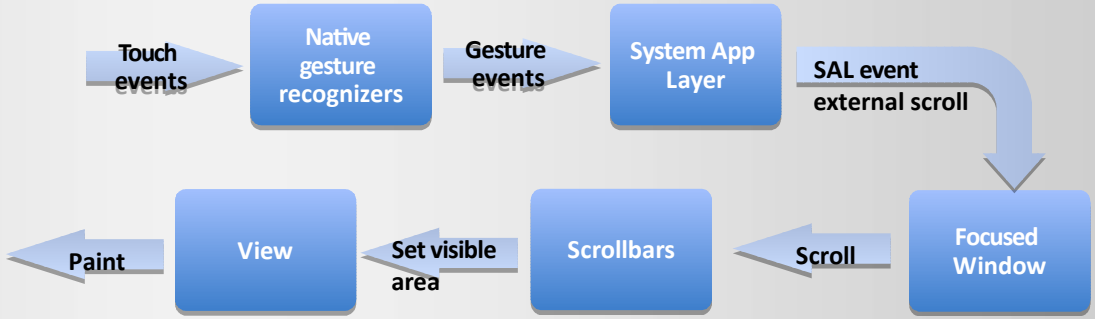
App layer is now creating delta value in pixels

Scroll event now contains delta pixels for both X & Y

Window is now converting pixels to new scroll position

Pan gesture

- Problems:
- Horizontal & Vertical are sequential
- Scrollbars position units can be larger than pixels
- We need to cut scrollbar out of the loop



Flick gesture

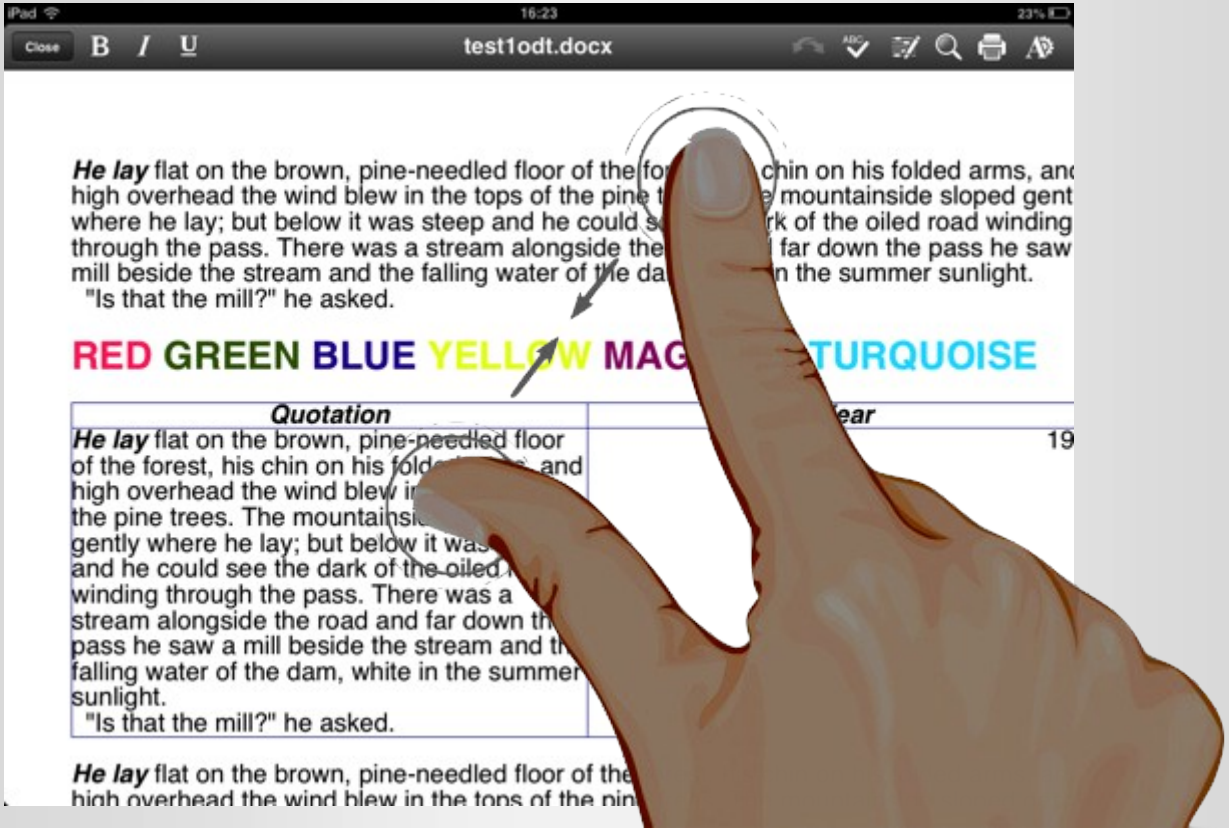
- When pan is ending with non zero velocity
- Keep the events coming based on speed and inertia

*Extrapolated speed = Pan end speed – Deceleration * t*
*Position inertia = Extrapolated speed * t*

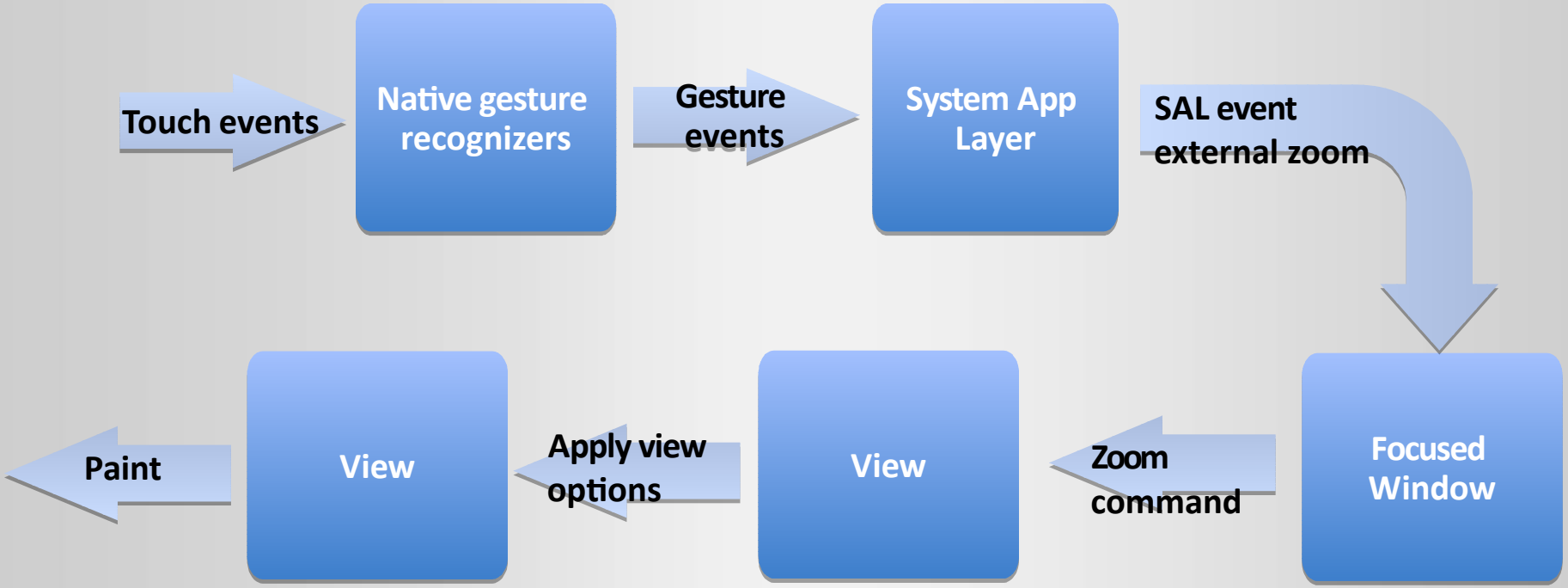
- Stop when Extrapolated speed is small enough

Pinch gesture

- Continuous zoom in pixel level
- Includes also pan to follow fingers

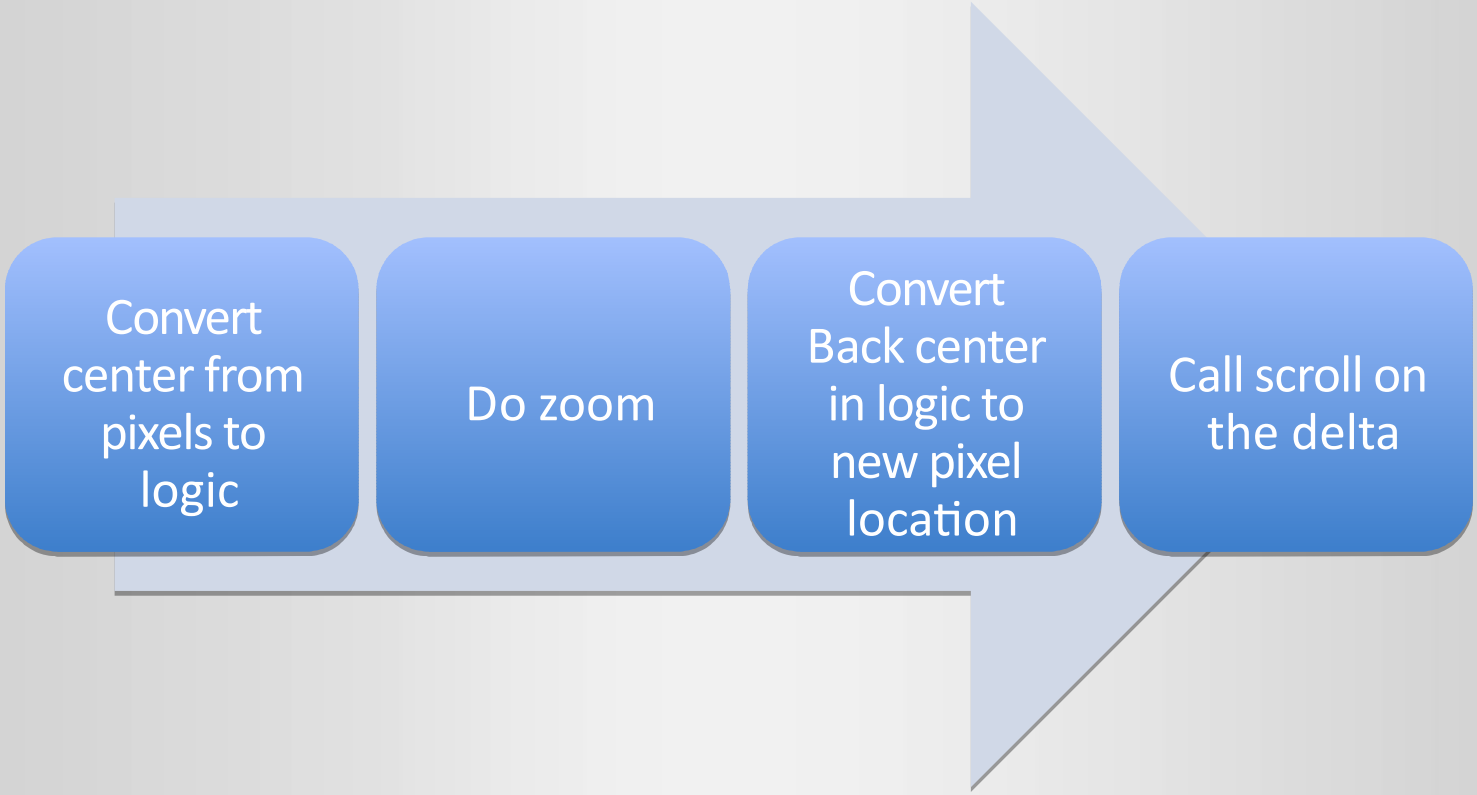


Pinch gesture



Pinch gesture

- Anchoring zoom around finger center
- Call scroll after zoom to adjust view position

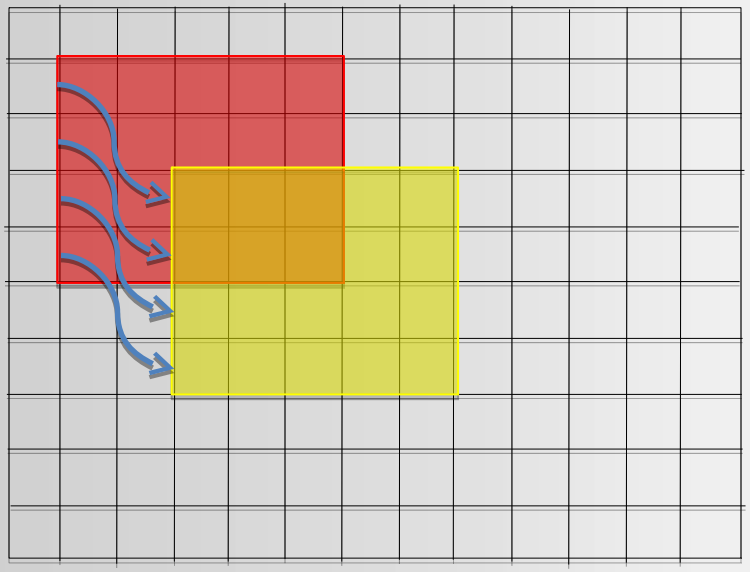


Optimizing rendering

- Copy area –> the scroll bottleneck
- Basebmp graphic commands implementation using inefficient pixel accessor -> especially in pixel copy
- Also could not handle copying overlapping areas in the same buffer.

Optimizing rendering

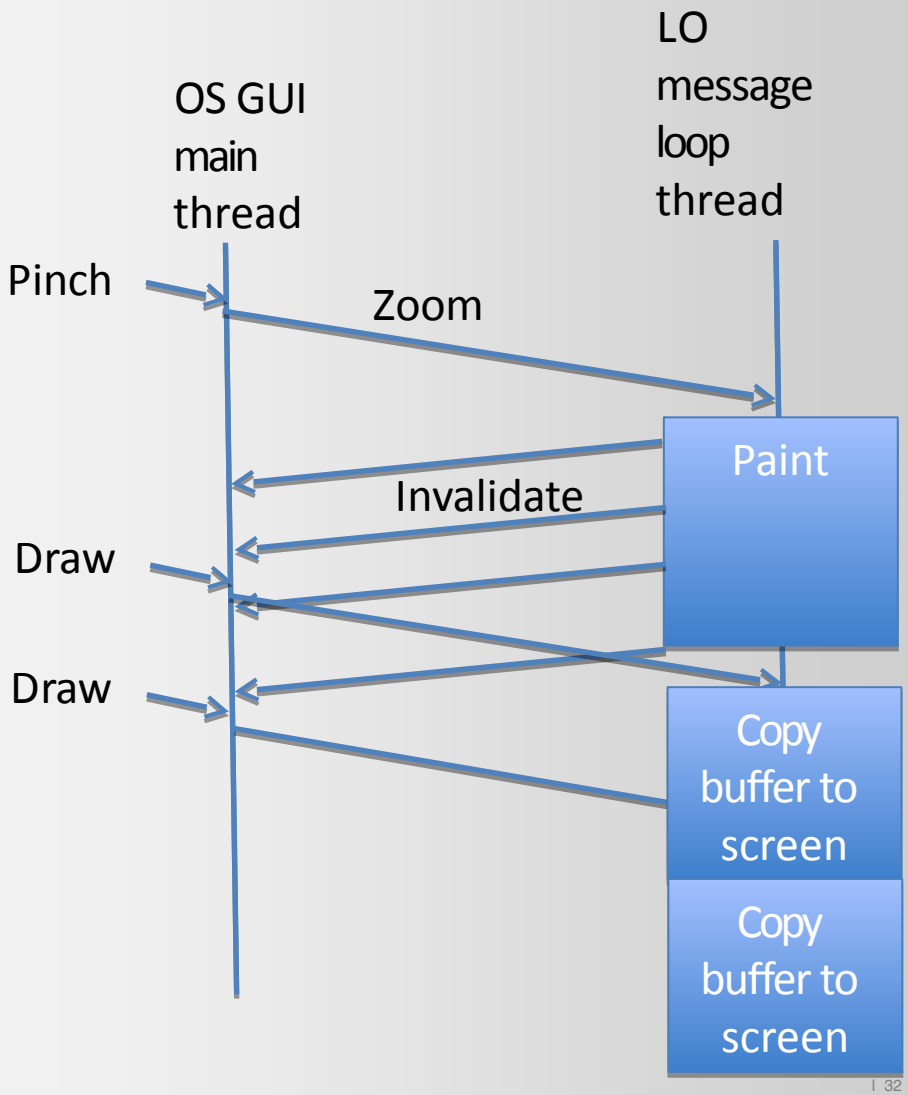
- Direct copy area – new implementation for copy memory blocks.
- Called when no need to do pixel convert or scale
- Also handles overlapping source and destination



x100 Speedup

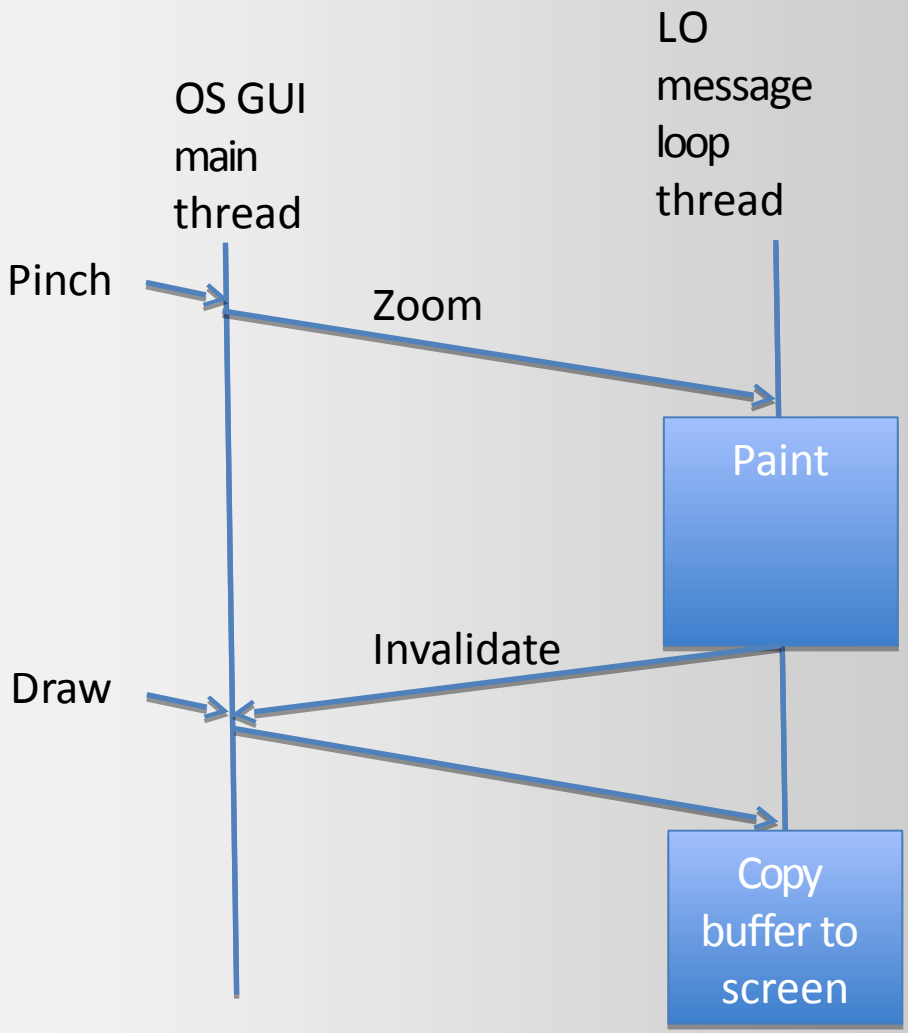
Optimizing rendering

- Screen invalidate should be once per paint
- Damaged tracker is firing every graphic command



Optimizing rendering

- Switched to use screen flush command instead of pixel damaged tracker

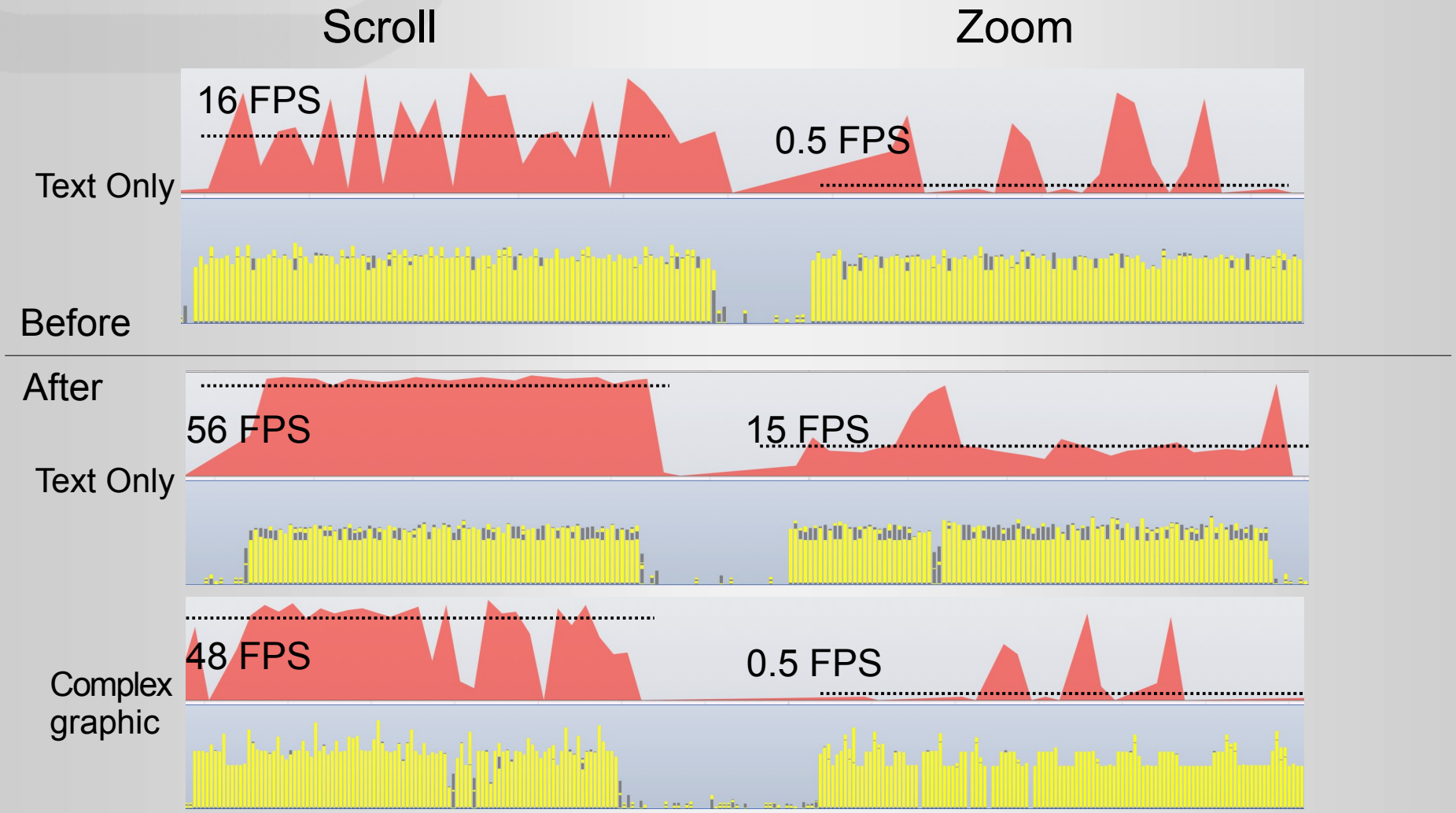


Optimizing rendering

- Avoid pixel color space converting
- Color space of all off-screen buffers should match the screen

x2 Speedup

Optimizing rendering



What still needs to be done?

Smoother gestures

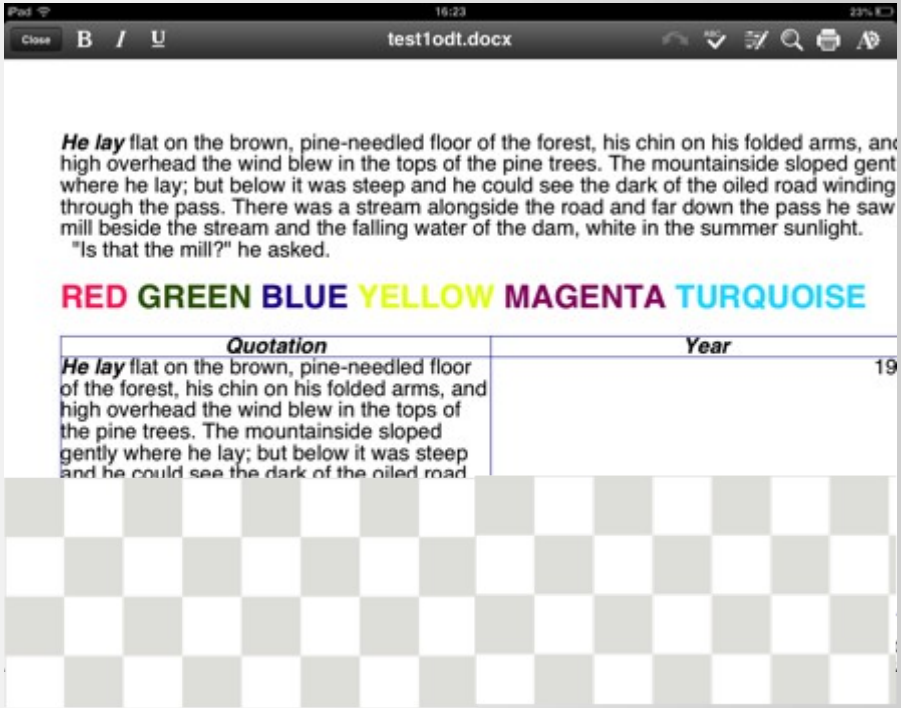
- Improve performance of basebmp graphic engine implementation -> use native graphic or OpenGL.
- Remove functionality in paint that is irrelevant to offscreen rendering

Smoother gestures

- **Low quality rendering while gesture in progress**
  - Reduced resolution
  - Disable complex graphic

Smoother gestures

- **Background rendering**
  - Render quick place holder -> Full render in background
  - Cache rendered off-screen bitmaps and use them as tiles for scroll and zoom
  - Render text only as quick place holder -> full graphic in background



Code optimizations

- Lots of unused code is in the app
- This affects startup time, memory usage and installation package size

Be part of LibreOffice mobile effort!

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