

hulu

Motion with Constraint Layout

Android meetup

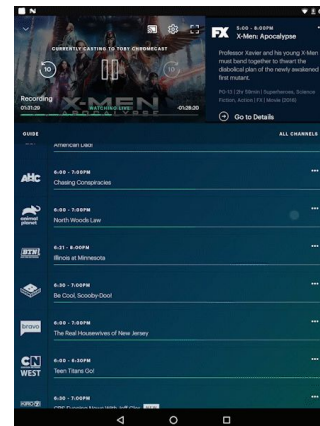


Agenda

- Motivation
- How Hulu's app uses ConstraintLayout
- Advanced features for animation
- Gotchas
- Questions

Demo project.

<https://github.com/hulu/android-constraintlayout>



Why ConstraintLayout?

- Problematic layout definition with other view groups
- Define a layout in a more declarative way
- Describe a view's relationship with the views around it
- Flat hierarchy improves readability and performance
- Provides handy features

Aspect ratio

Groups, PlaceHolders

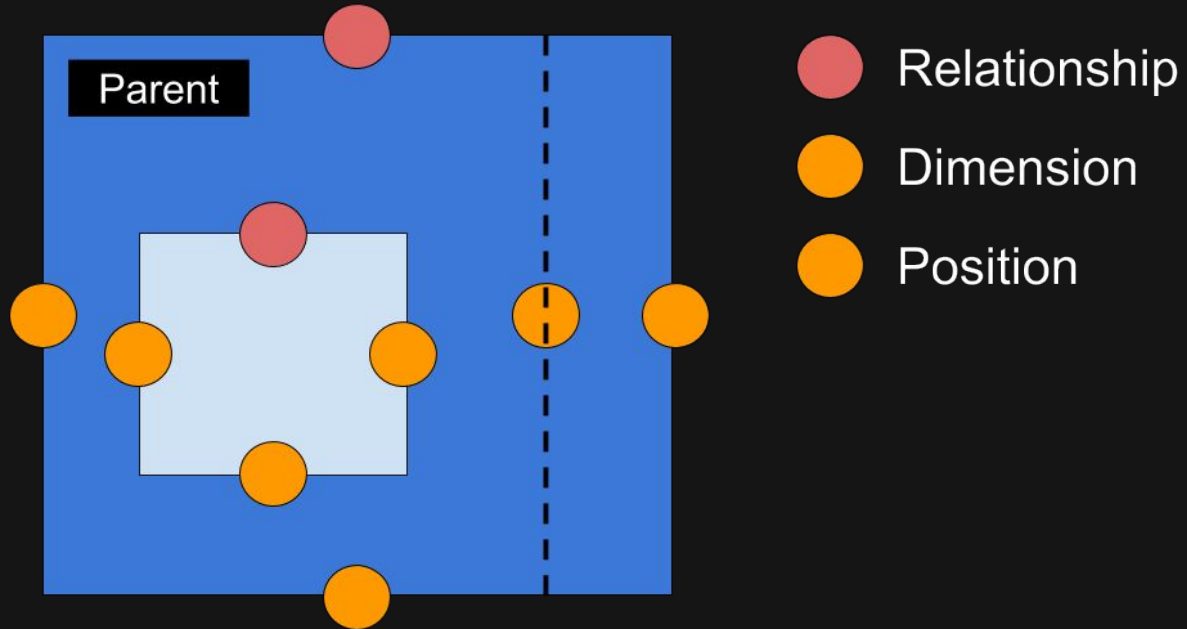
ConstraintSets

MotionLayout

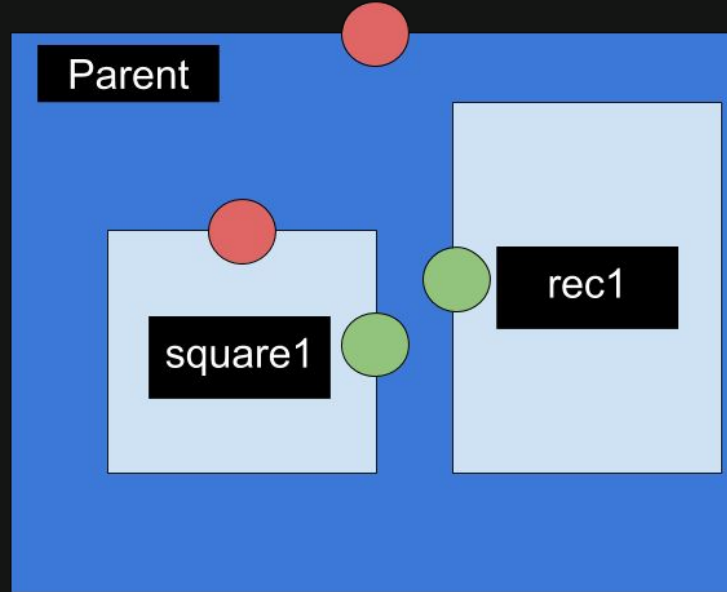
Background

- Introduced at Google I/O 2016
- Alternative for RelativeLayout, LinearLayout, FrameLayout, GridView
- Fully supported by Android Studio Layout Editor
- Current version 1.1.3
- ConstraintLayout 2.0 is in Alpha which adds MotionLayout, ConstraintStates and more optimizers

What's a constraint?



How is a constraint defined?

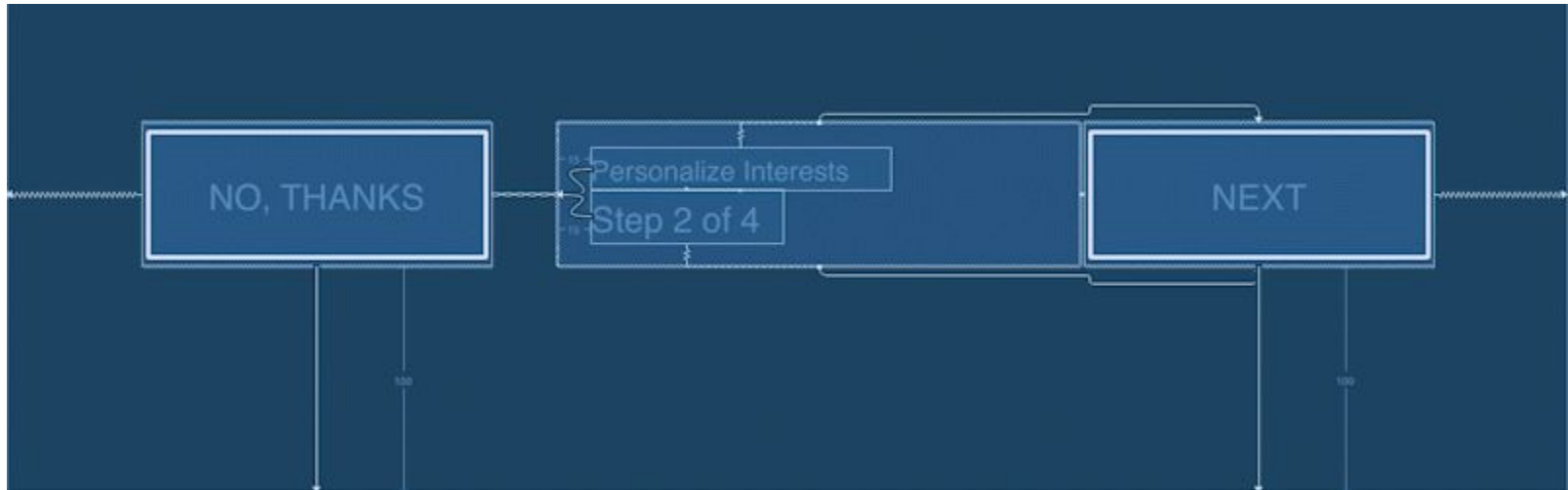


- `layout_constraintEnd_toStartOf=@id/rec1` `layout_width=30dp`
- `layout_constraintTop_toTopOf=parent` `layout_height=0dp`

Hulu Android app

Our use cases

Chains



SEC Tournament : Georgia vs Tennessee

S1 E4 Pilot



CURRENTLY CASTING TO LIVING ROOM



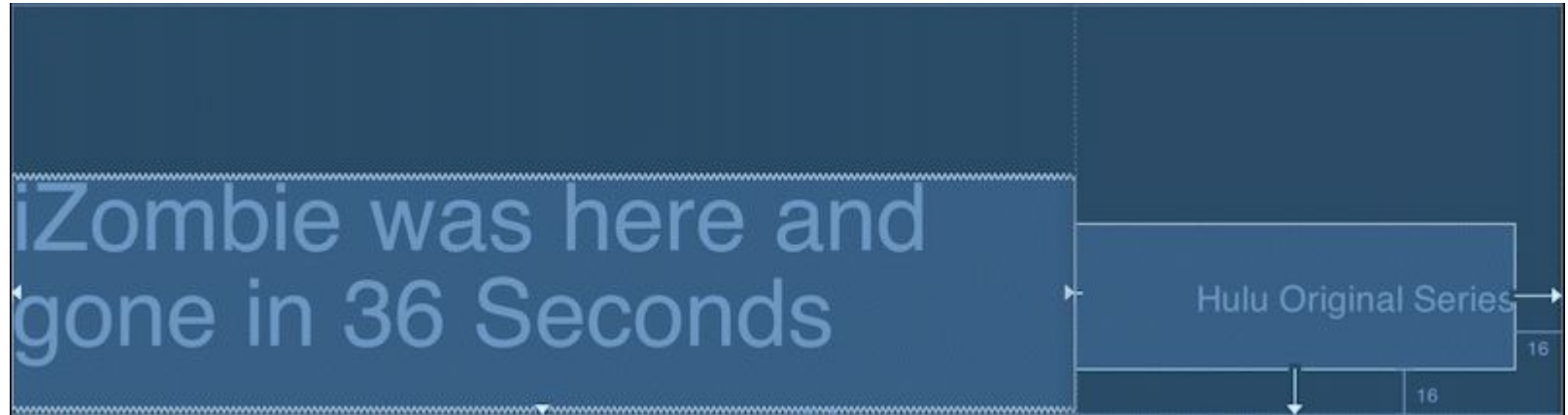
Recording



JUMP TO LIVE



Barriers

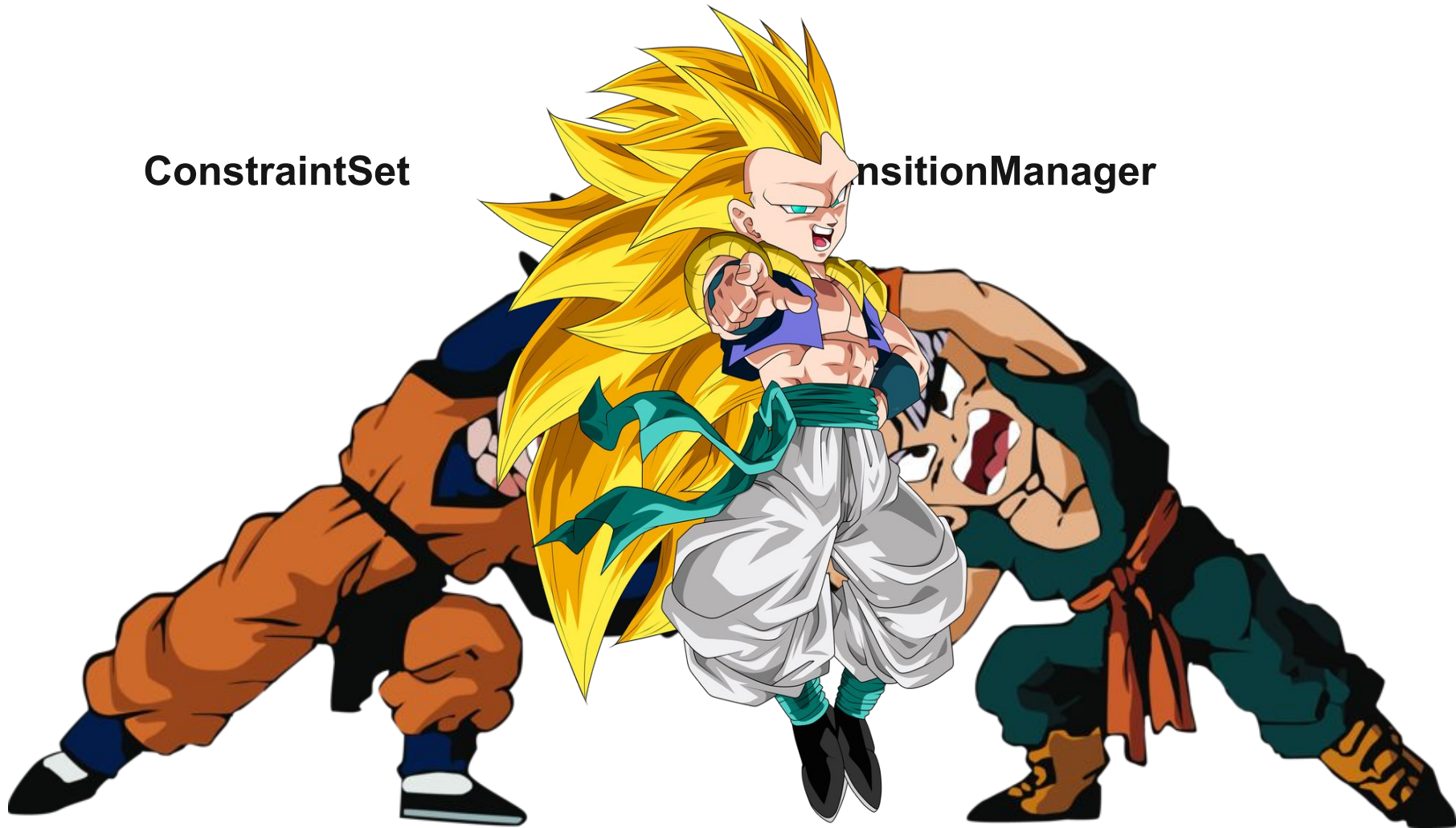


ConstraintSet

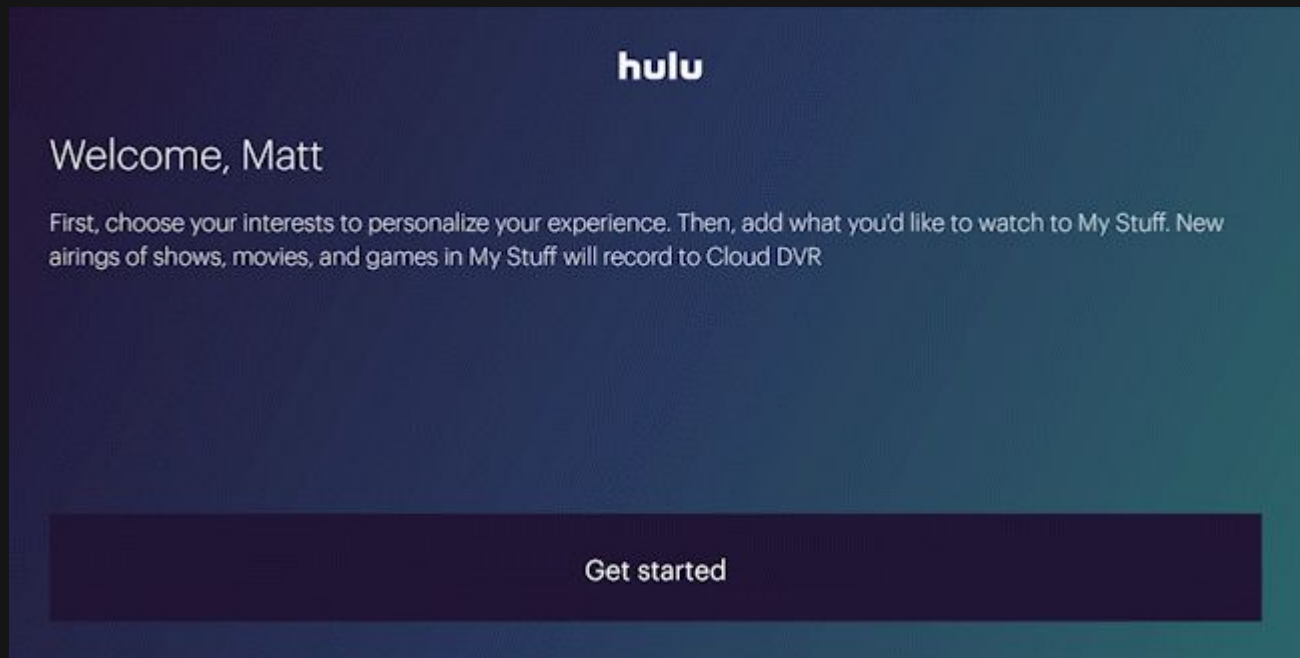
```
ConstraintSet constraintSet = new ConstraintSet();  
ConstraintLayout container = (ConstraintLayout) getView();  
constraintSet.clone(container);  
constraintSet.setVisibility(R.id.negative_button, ConstraintSet.GONE);  
constraintSet.setHorizontalWeight(R.id.label_background, 3);  
constraintSet.applyTo(container);
```

ConstraintSet

TransitionManager

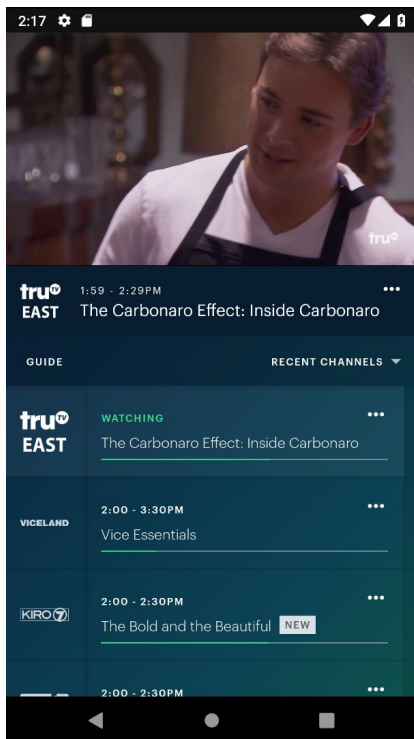


The result:



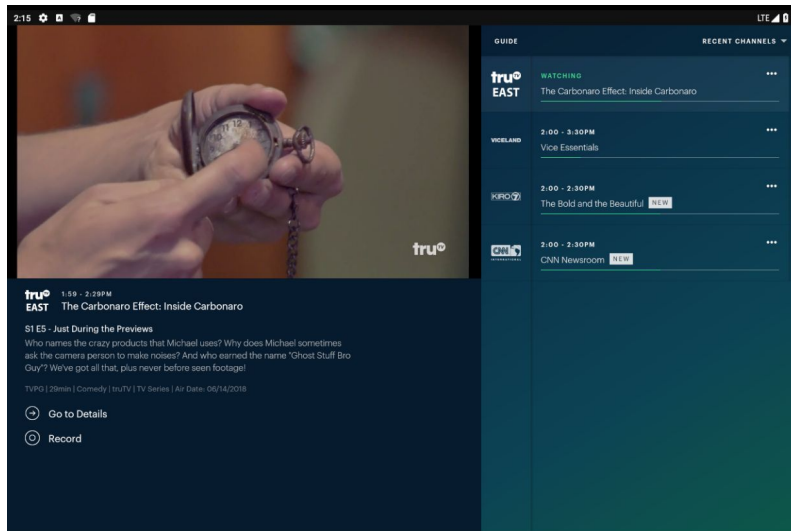
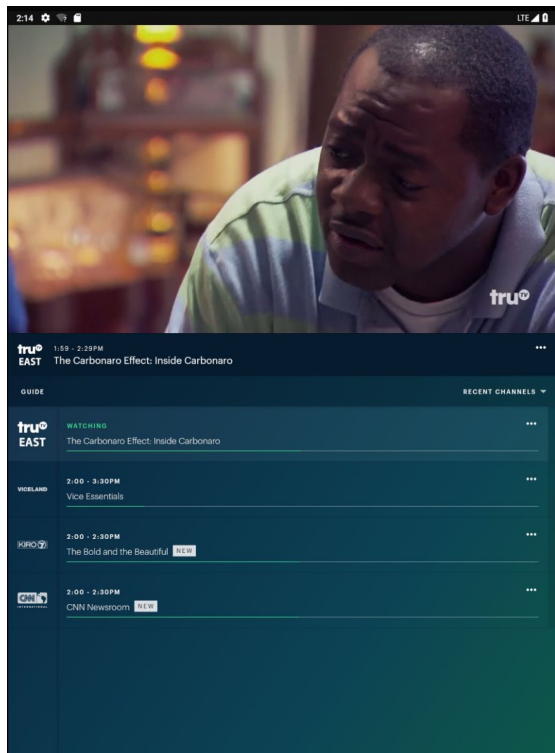
Player configurations

Phone



Player configurations

Tablet

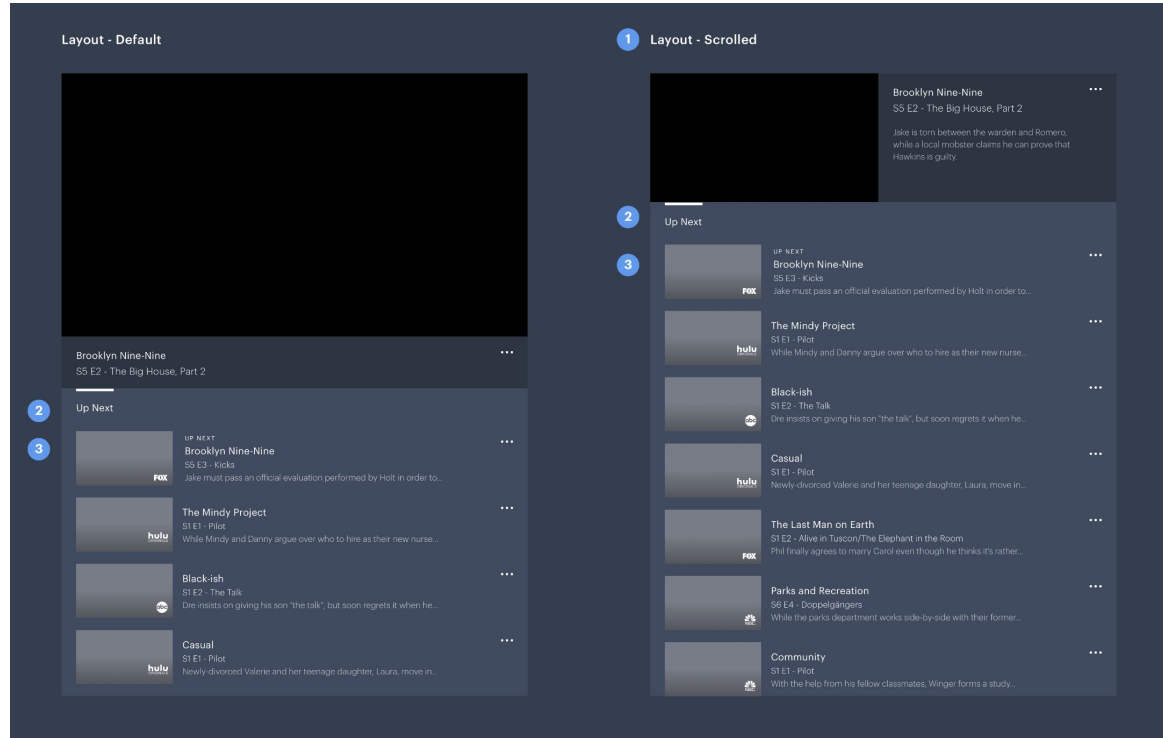


ConstraintSets and ConstraintState

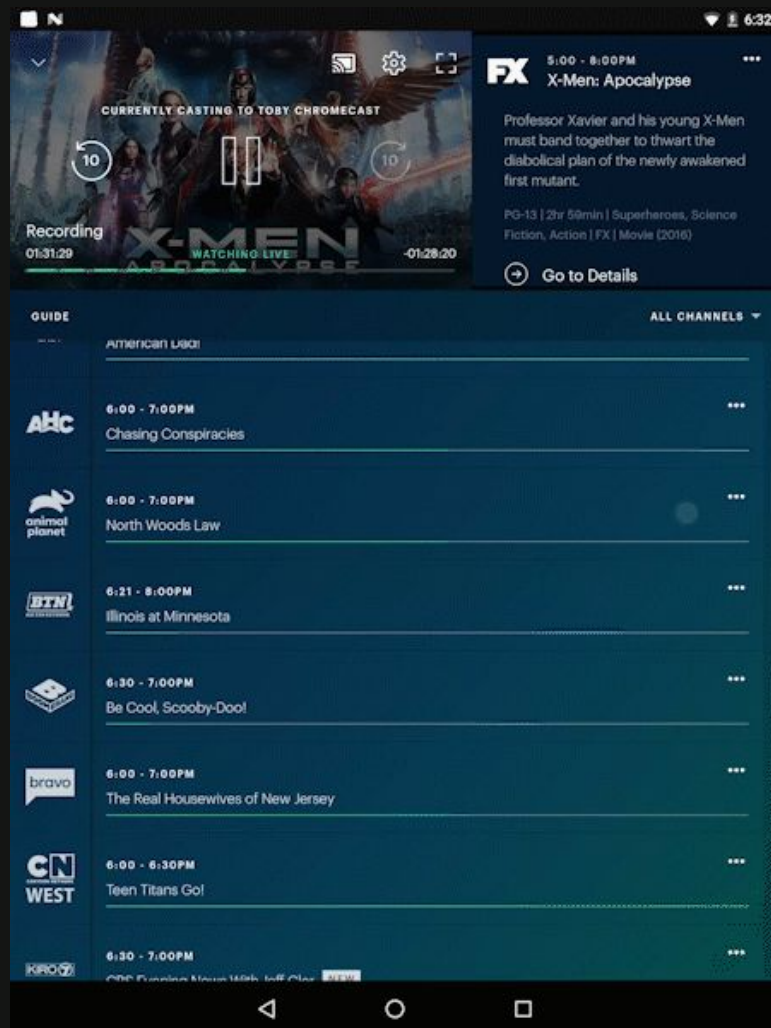


Demo

Requirement:



End result:



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KeyFrame

- Create a **KeyFrameSet**
- **KeyPosition** to set keyframes for sizes and positions
- **KeyAttribute** to animate attributes like alpha or custom values
- **KeyCycle** to create oscillating animations using **framePosition**
- **KeyTimeCycle** drive an oscillation by time rather than animation progress

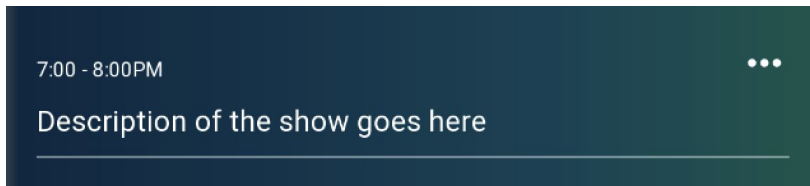
Demo

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Gotchas of Constraint Layout

Performance using CL on a list item.

- While developing our portrait player guide view, we realized there was some jank on the scrolling vertical portion of the guide.
- We adopted constraint layout since version 1.0 and we started using it across features indistinctly.
- Used constraint layout in the cells of the liveguide that is a very simple 3 view cell but using match constraints and having to execute the algorithm entirely everytime.



Performance analysis

- **Profiler and SysTrace tool**
- **Examine CPU threads and method call times**
- **Measure time required for:**

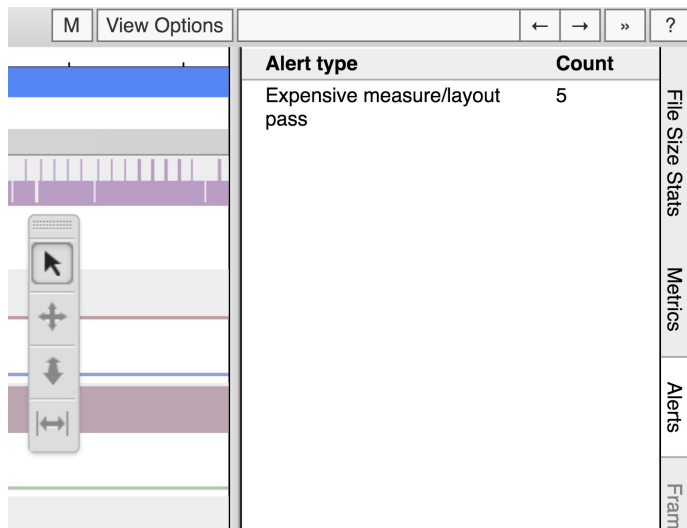
Measure

Layout

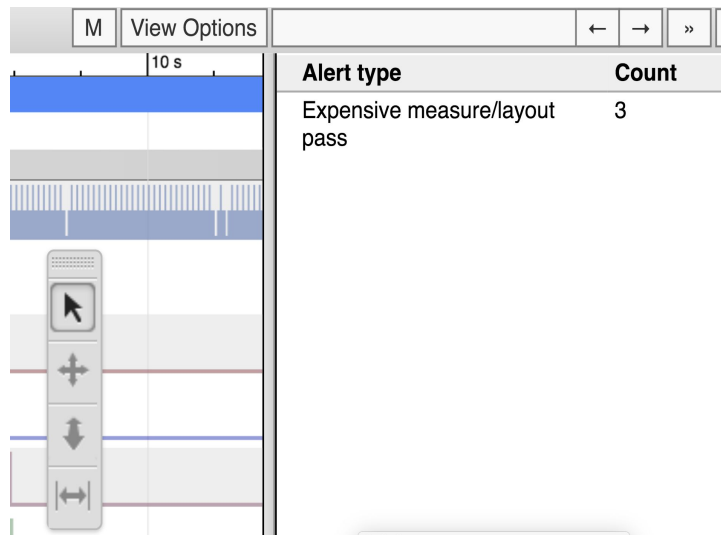
Draw

Performance analysis results

Relative/CoordinatorLayout version



MotionLayout version



`python systrace/systrace.py --time=20 -o ~/trace.html gfx view res`

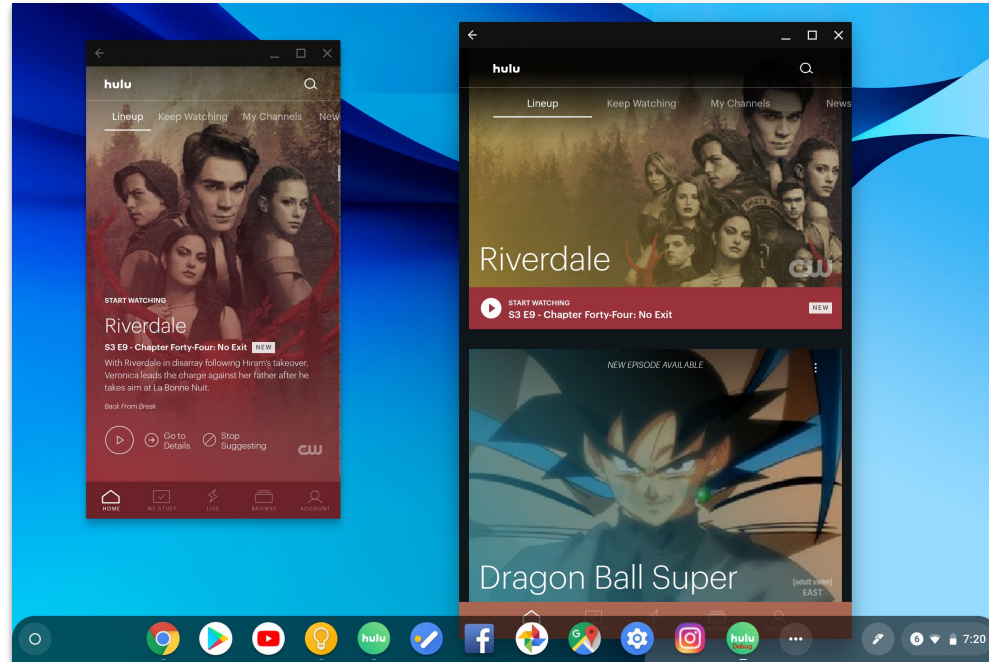
Demo

Common mistakes

- **Nesting another viewgroup inside a ConstraintLayout**
- **Using match_parent intentionally or unintentionally**
- **Using invalid attributes from other ViewGroups**
 - Orientation
 - Gravity
- **Using fixed sizes on text**
- **Convert layouts just by using the AS converter**
- **Not cleaning up what Visual Editor can add.**

Demo

Testing UI responsiveness resizing the window



Wrap Up/Questions

@memog_costecho

@MattLalley

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THANK YOU