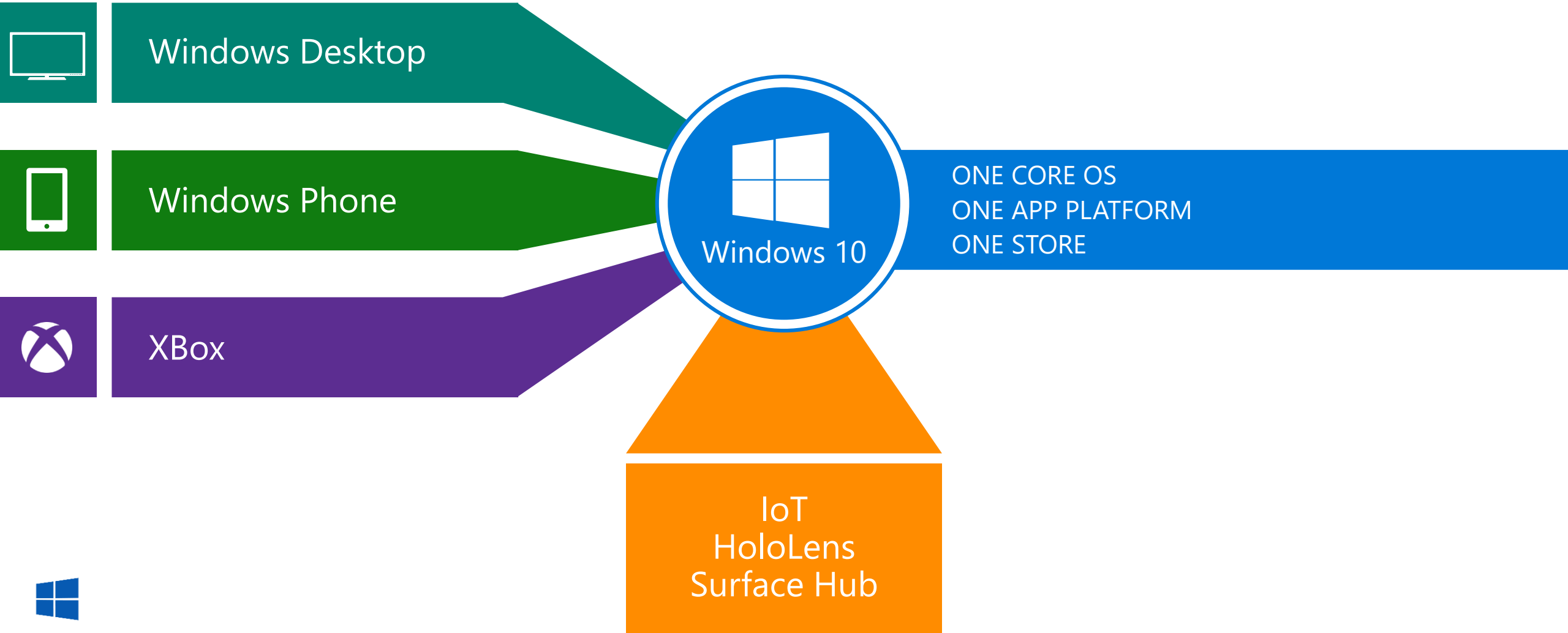
Continuum: evolving the mobile experience

Abolade Gbadegesin
Software Engineer, Windows

Windows

I worked for a long time on converging the core OS.

The journey to one Windows



… on the full range of Windows devices

Phone

Phablet

Small Tablet

Large Tablet

2-in-1s
(Tablet or Laptop)

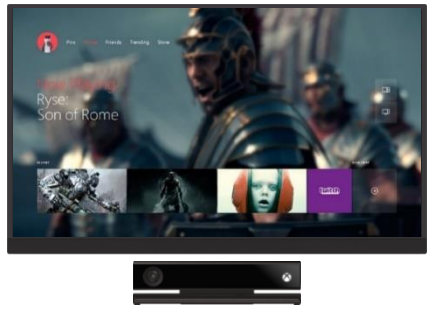
Classic
Laptop

Desktops
& All-in-Ones

Windows 10

Surface Hub

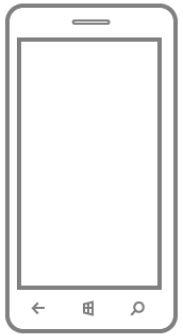
Xbox



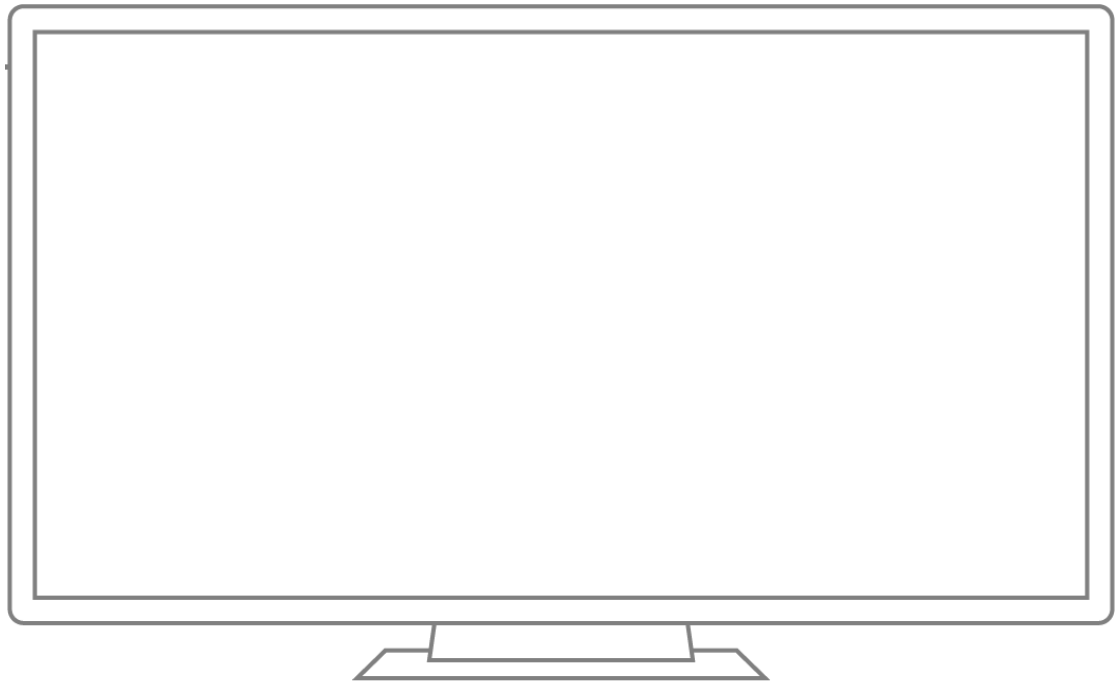
Holographic

IoT

But there’s still a lot in there that’s not converged…



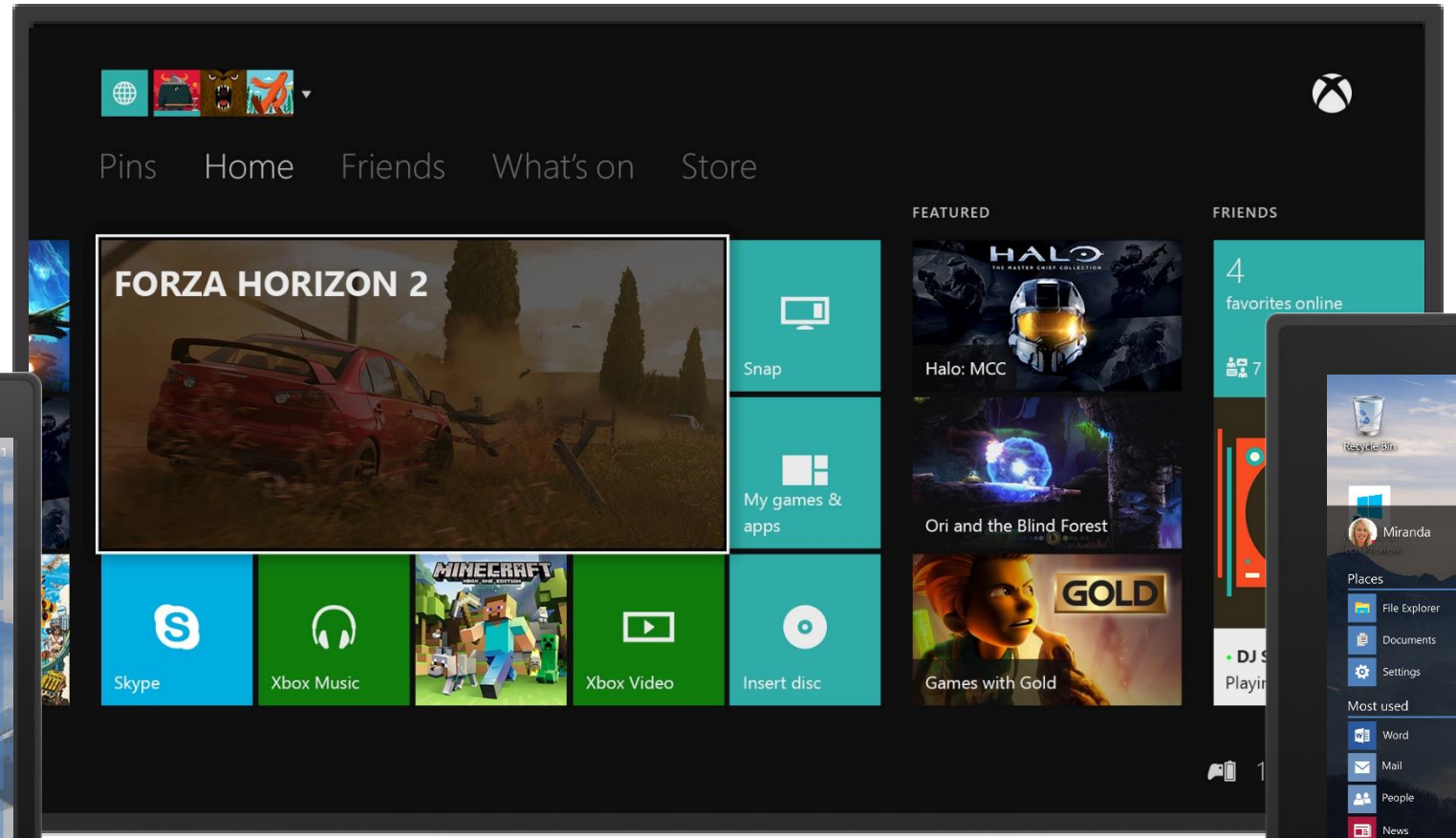
"Phone optimized UI"



"Big Screen optimized UI"

How much of what’s not converged is due to deep, fundamental differences between form factors?

Optimized Shells for each device



How much of what’s different is due to our limited thinking, or legacy, or …?

Can applications be built to ‘adapt’ to what I need at a given moment, independent of form factor?

If so, how far can we take that adaptation before things start to break down and it makes more sense to have fundamentally different applications?

Build one app for all Windows devices

One operating system

One Windows core for all devices

One developer platform

Apps run across phone, tablet, PC, Xbox and more

One Dev Center

Single submission flow and dashboard

One Store

Global reach, local monetization Consumers, Business and Education

Build one app for all Windows devices

Really?

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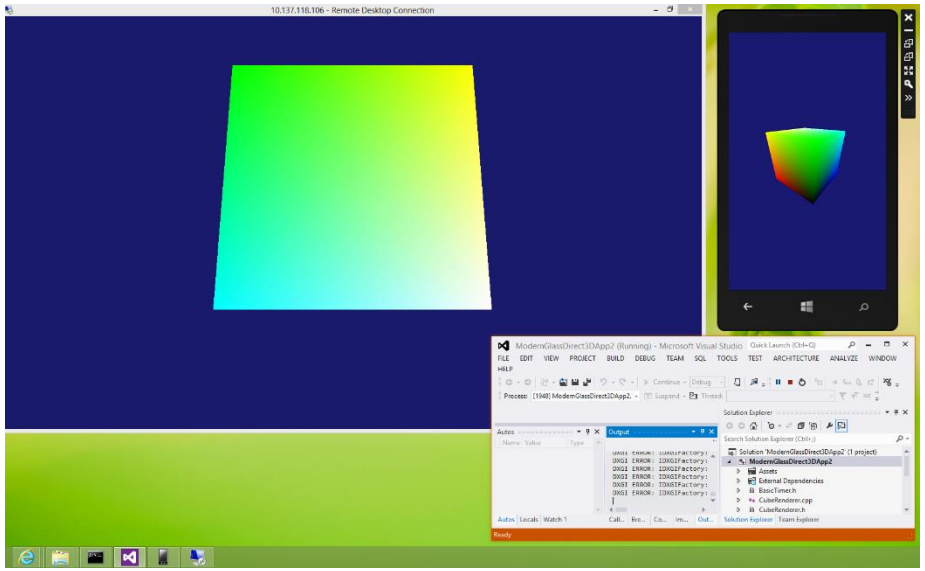
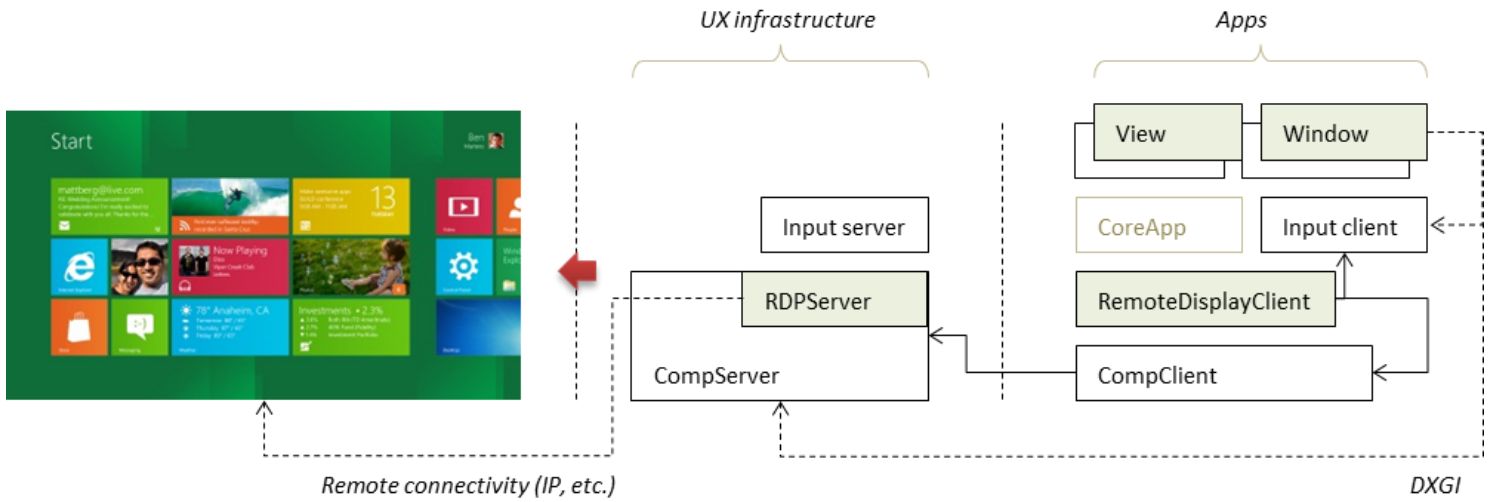
“Modern Glass” Prototype



Dynamically extend a phone’s display and interaction to another interaction surface

… and look for obstacles.

“Modern Glass” Building Blocks



1. Port multi-monitor code from PC to phone
2. Connect display output to RDP encoder
3. Capture remote input for routing back to phone
4. Add multi-view support for apps

Modern Glass was renamed Wizard / Tinman.

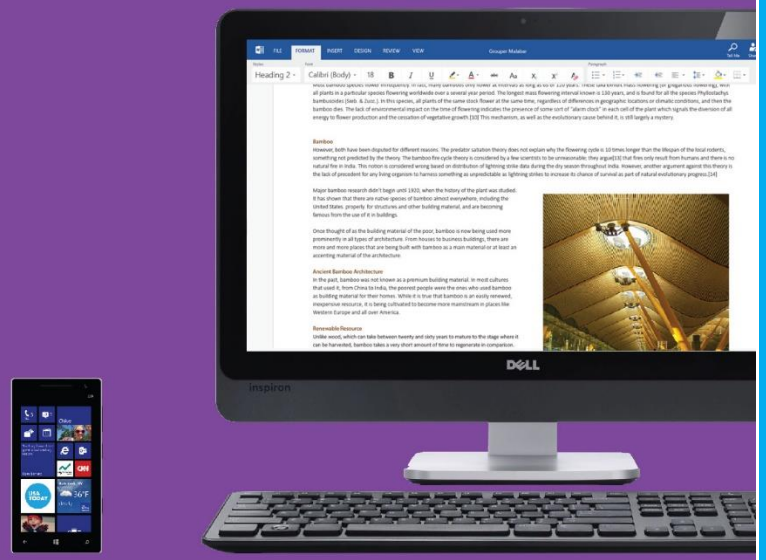
Wizard / Tinman was rebranded Continuum.

Is it a smartphone or is it a gaming console? Yes.

Your Windows Phone now powers other screens like a TV or a computer monitor while still working as a Windows Phone.

Windows

The phone that thinks it's a PC.



Your Windows Phone now powers other screens like a TV or a computer monitor while still working as a Windows Phone.

Windows

Many screens, one brain.

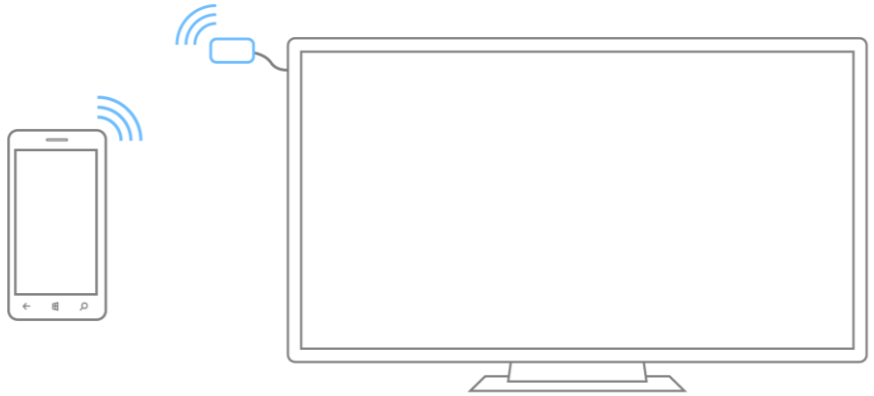
Your Windows Phone now powers other screens like a TV or a computer monitor while still working as a Windows Phone.

Windows

OSG

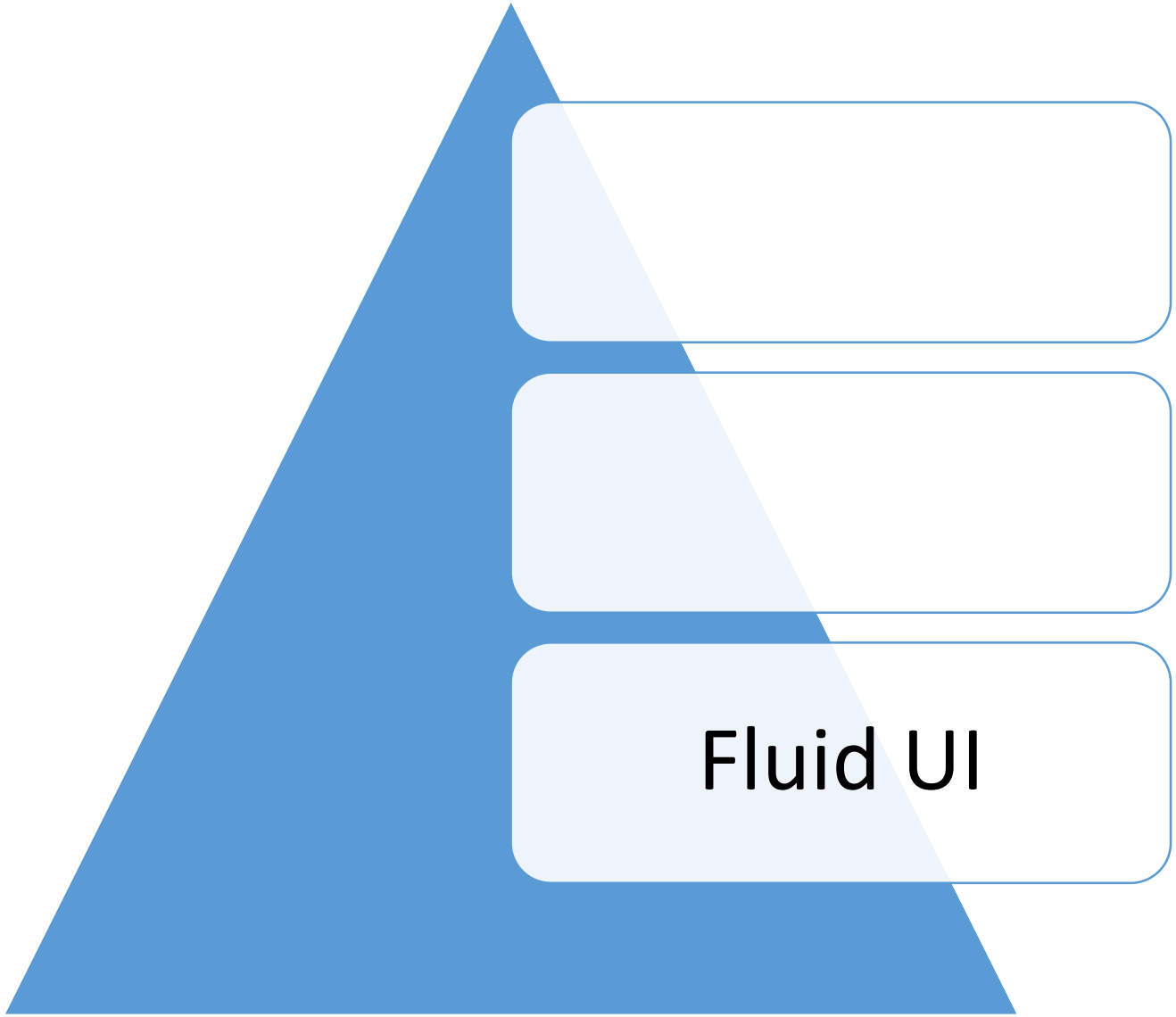
Demo.

Challenges



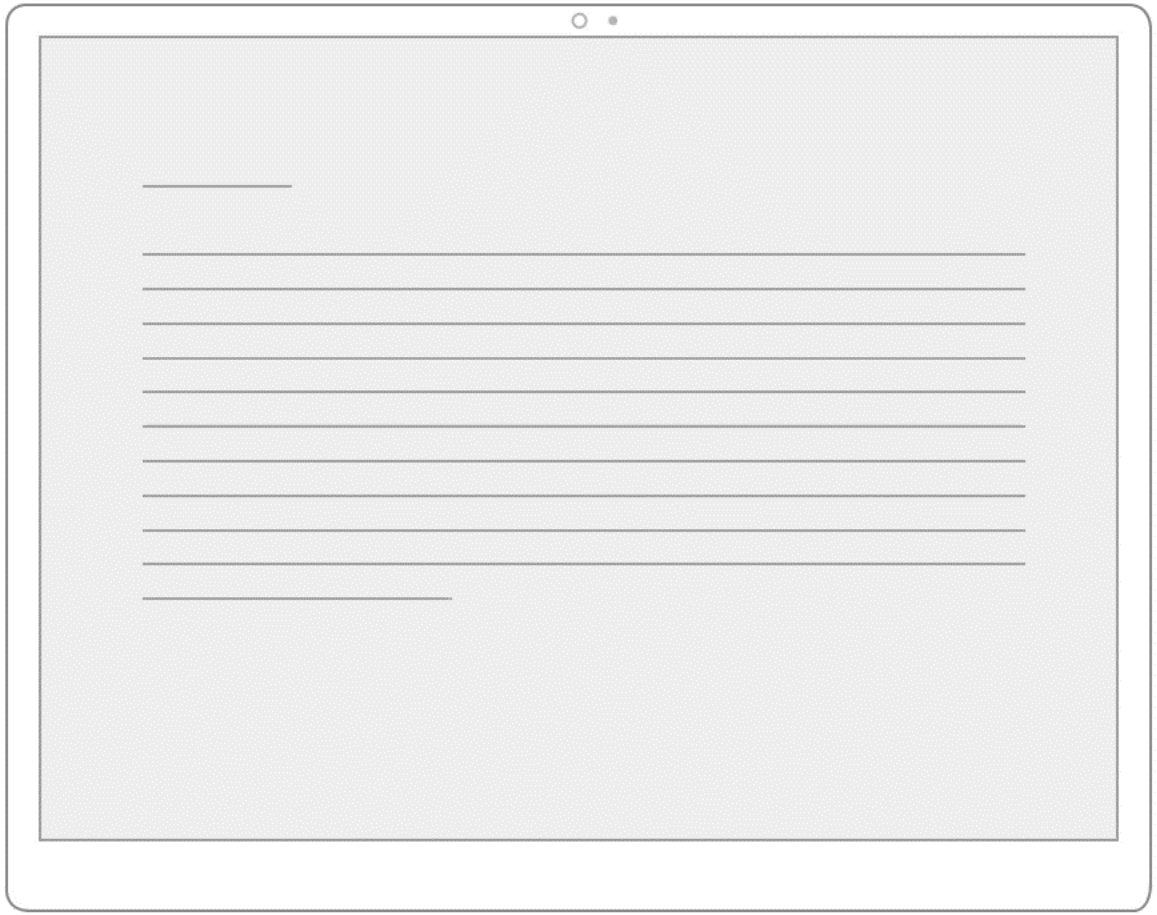
- Platform features missing on mobile, e.g. USB host, drivers
- Inappropriate platform & UX behavior, e.g. back stack, multi-tasking
- Adapting existing apps with minimal changes
- Battery life

Some of the developer features.


Fluid UI

Fluid UI

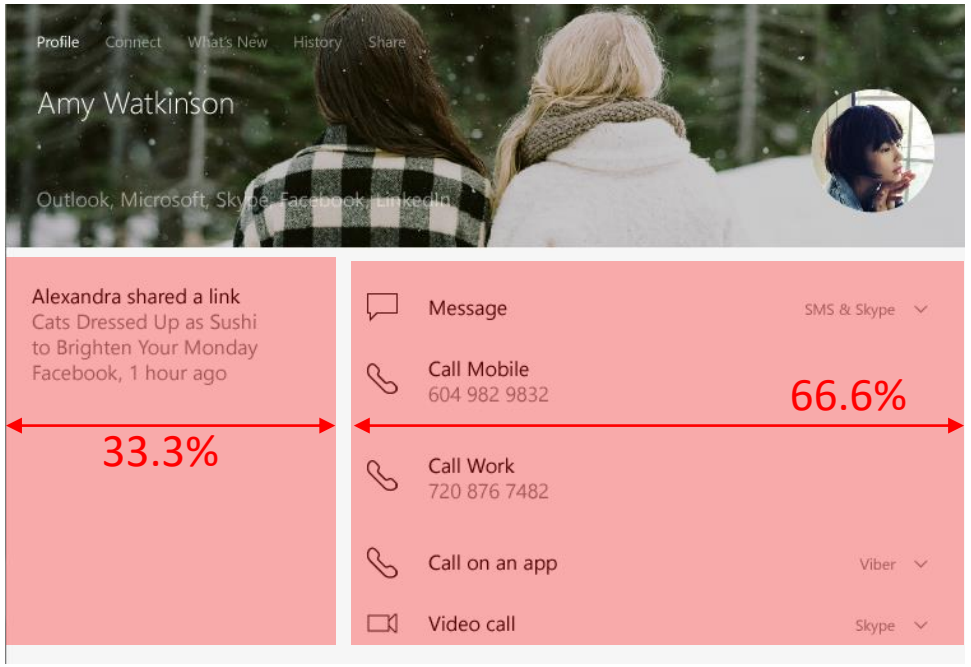
Given a window size change, your app should **resize** to any screen .



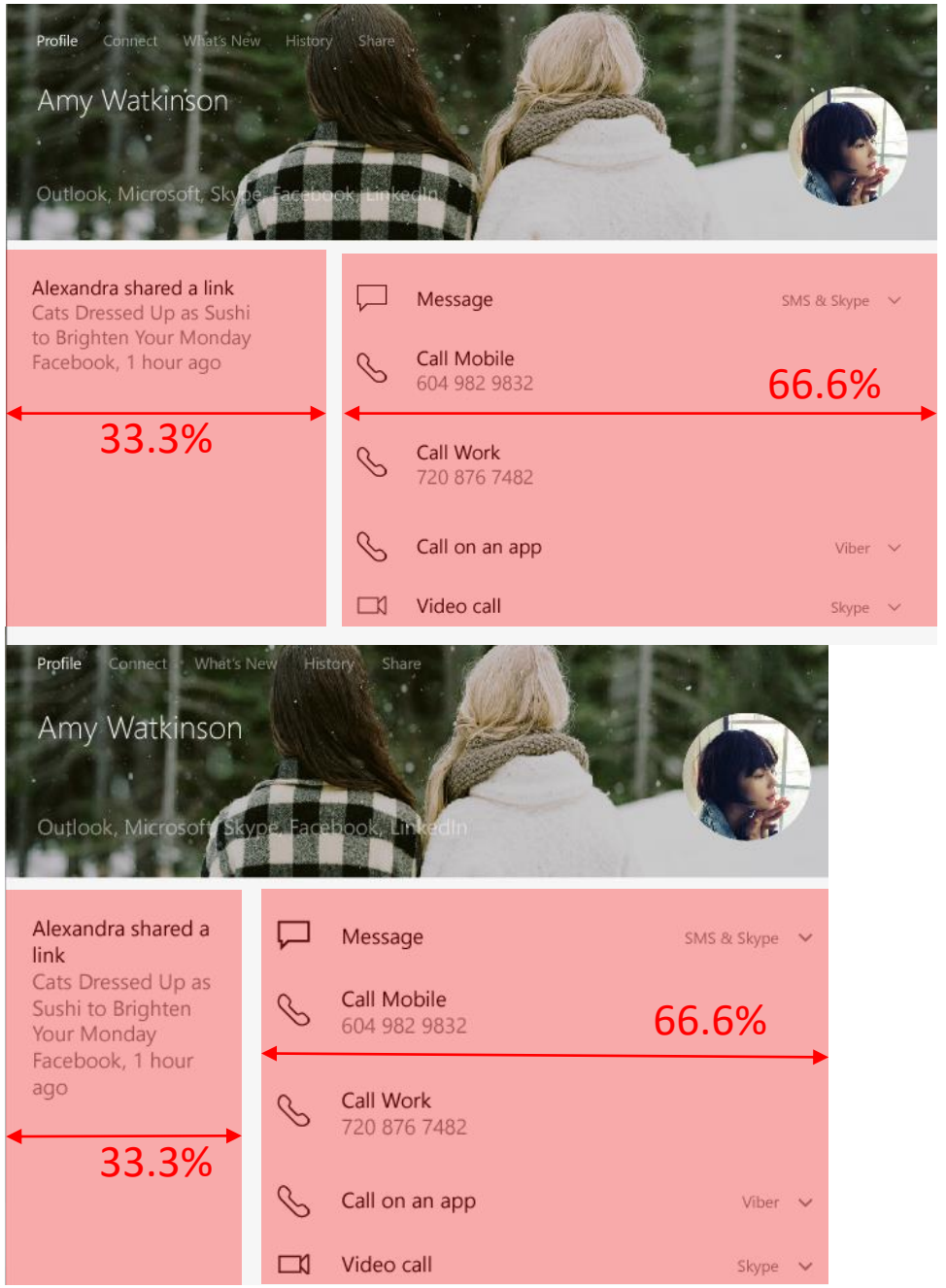
Fluid UI

Use WrapGrid style controls to **reflow** app content to better fit any screen.

Fluid UI


Profile
Connect
What's New
History
Share
Amy Watkinson
Outlook, Microsoft, Skype, Facebook, LinkedIn
Alexandra shared a link
Cats Dressed Up as Sushi
to Brighten Your Monday
Facebook, 1 hour ago
33.3%
Message
SMS & Skype
Call Mobile
604 982 9832
66.6%
Call Work
720 876 7482
Call on an app
Viber
Video call
Skype

Fluid UI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604 982 9832
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Call Work
720 876 7482
Call on an app
Viber
Video call
Skype

RelativePanel class

[This documentation is preliminary and is subject to change.]

Defines an area within which you can position and align child objects in relation to each other or the parent panel.

Inheritance

Object
DependencyObject
UIElement
FrameworkElement
Panel
RelativePanel

Syntax

C# C++ VB

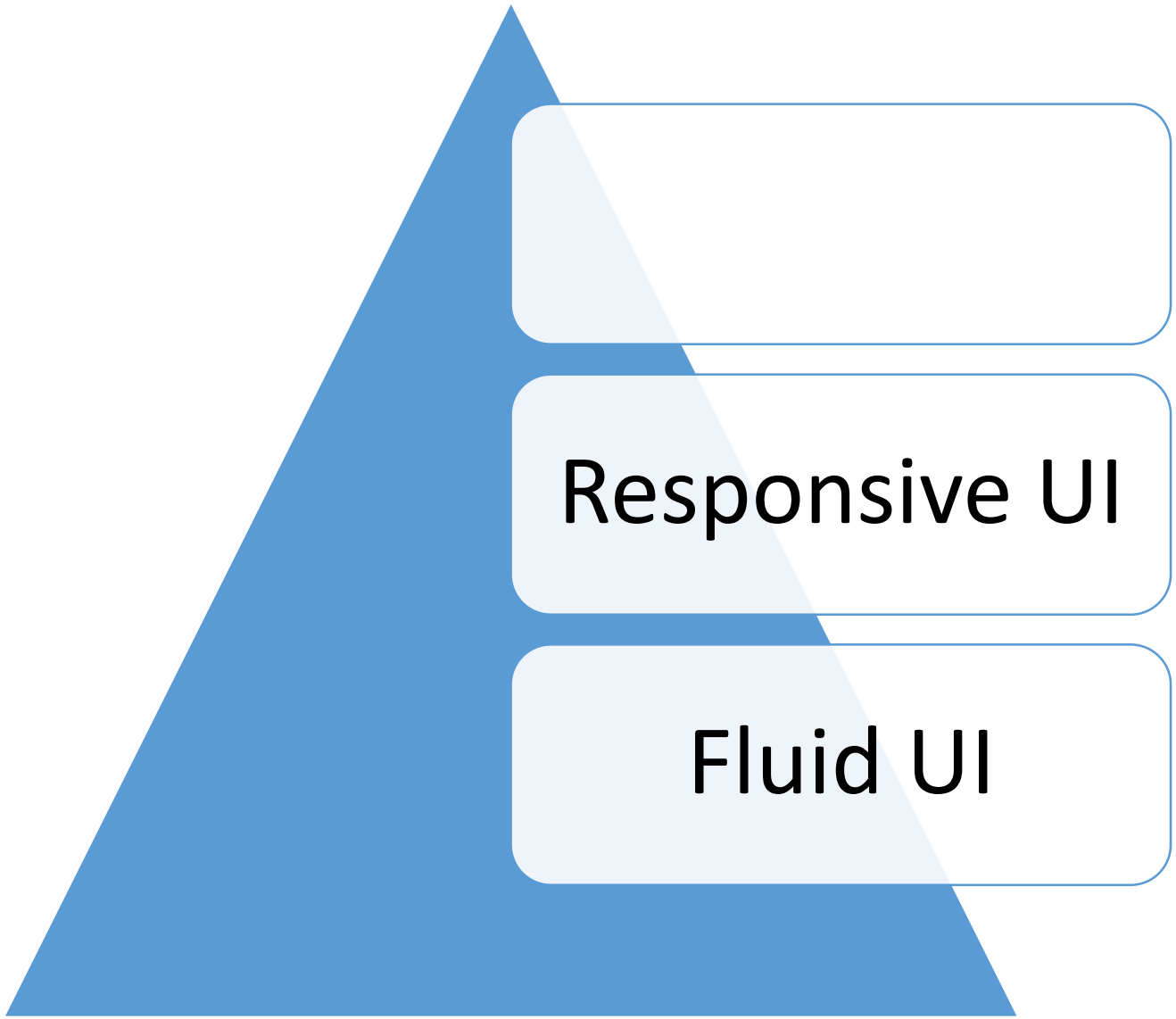
Copy

```
public class RelativePanel : Panel
```

Example

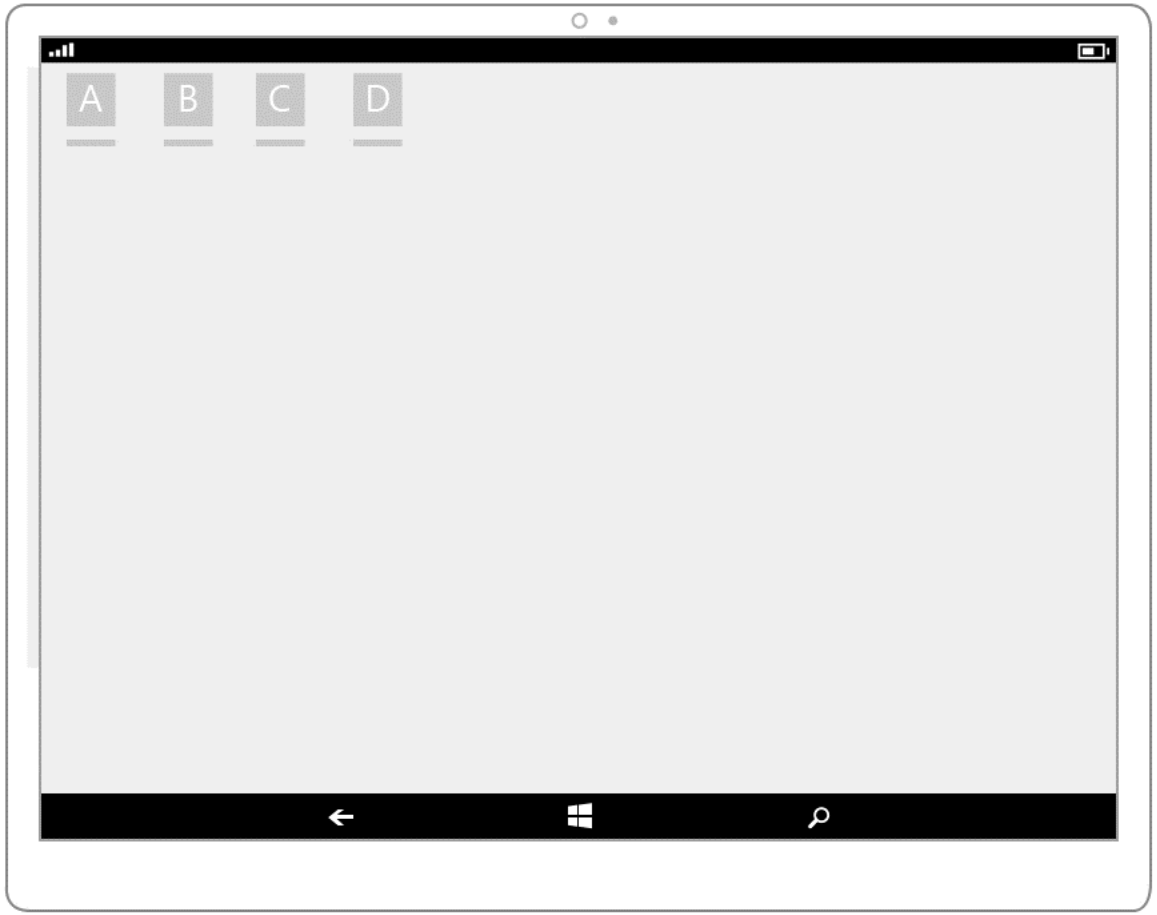

LTE
12:55
Connected to Actiontec Pro
tap to control
Forecast
Redmond, WA
66° F C
Partly Sunny
Feels Like 66 Wind 0 mph
Current as of 10:53 AM
MON 27
72° 57°
Partly Sunny
TUE 28
63° 49°
Cloudy
WED 29
62° 49°
Partly Sunny
THU
63°
Mostly
24 Hours
Summary
Details
71° 72°


Forecast
Sign in
Place
Forecast News Maps Historical Weather Favorites
Redmond, WA
66° F °C
Partly Sunny
Feels Like 66°
Wind 0 mph
Barometer 30.21 in
Visibility 9 mi
Humidity 61%
Dew Point 52°
MON 27 25% 72° 57°
TUE 28 90% 63° 48°
WED 29 80% 62° 49°
THU 30 70% 63° 48°
FRI 1 30% 64° 50°
SAT 2 10% 65° 50°
SUN 3 10% 67° 49°
MON 4 55% 67° 48°
TUE 5 70% 63° 49°
WED 6 70% 60° 47°
70° 72° 67° 64° 61° 58° 57° 59°
Sunrise
Moonrise
Humidity
Record Rain
Temperature


Responsive UI
Fluid UI

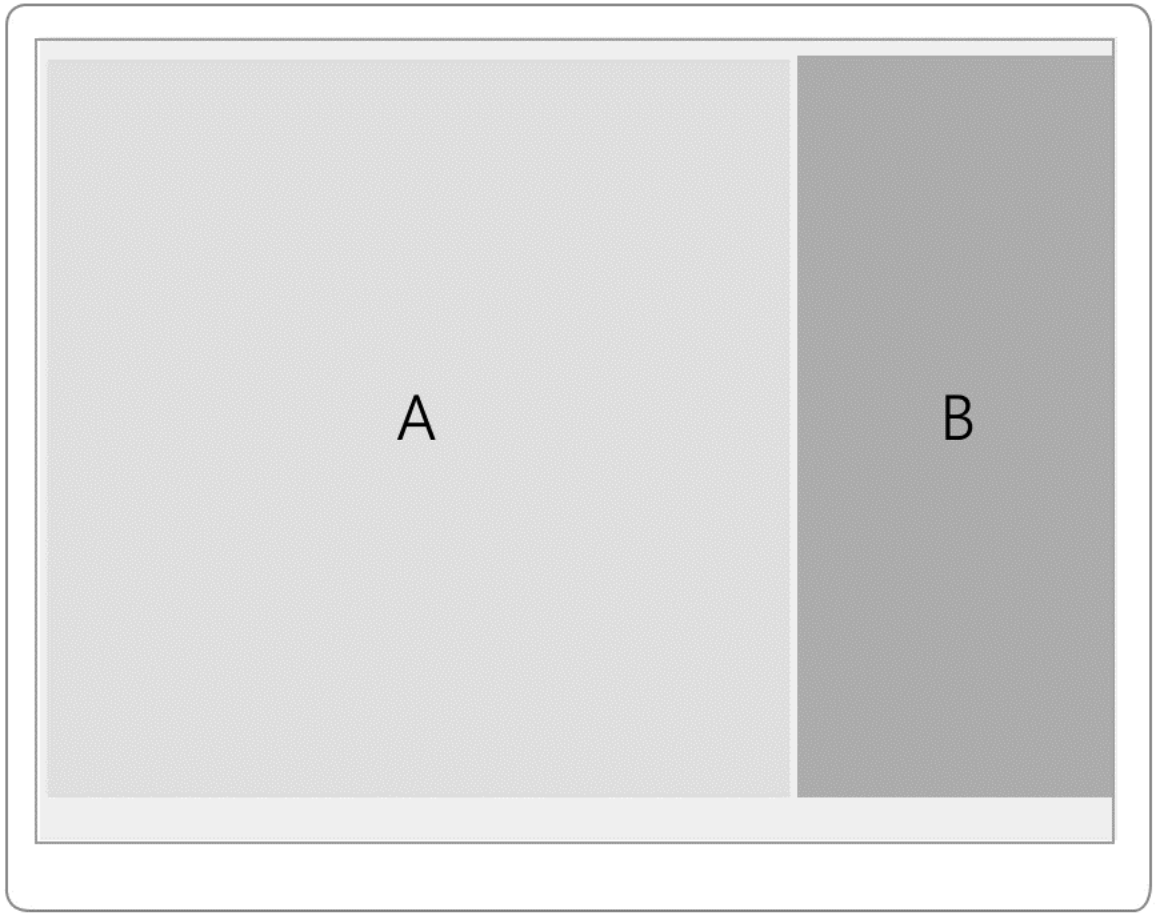
Responsive UI

Use AdaptiveTriggers to **reveal** or hide content at set snap points.



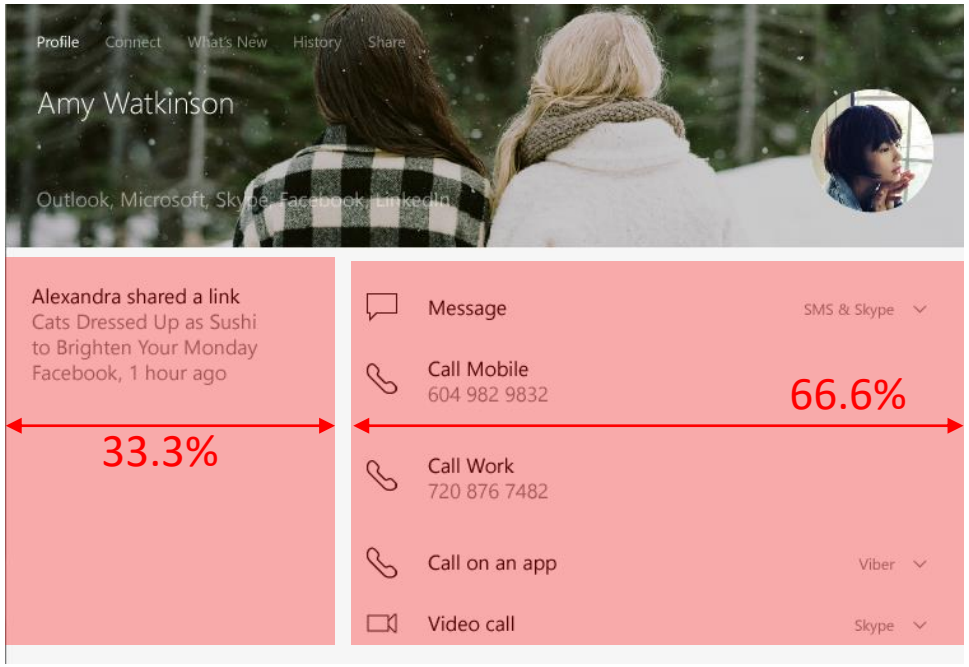
Responsive UI

Use AdaptiveTriggers to **reposition** UI at specific snap points.



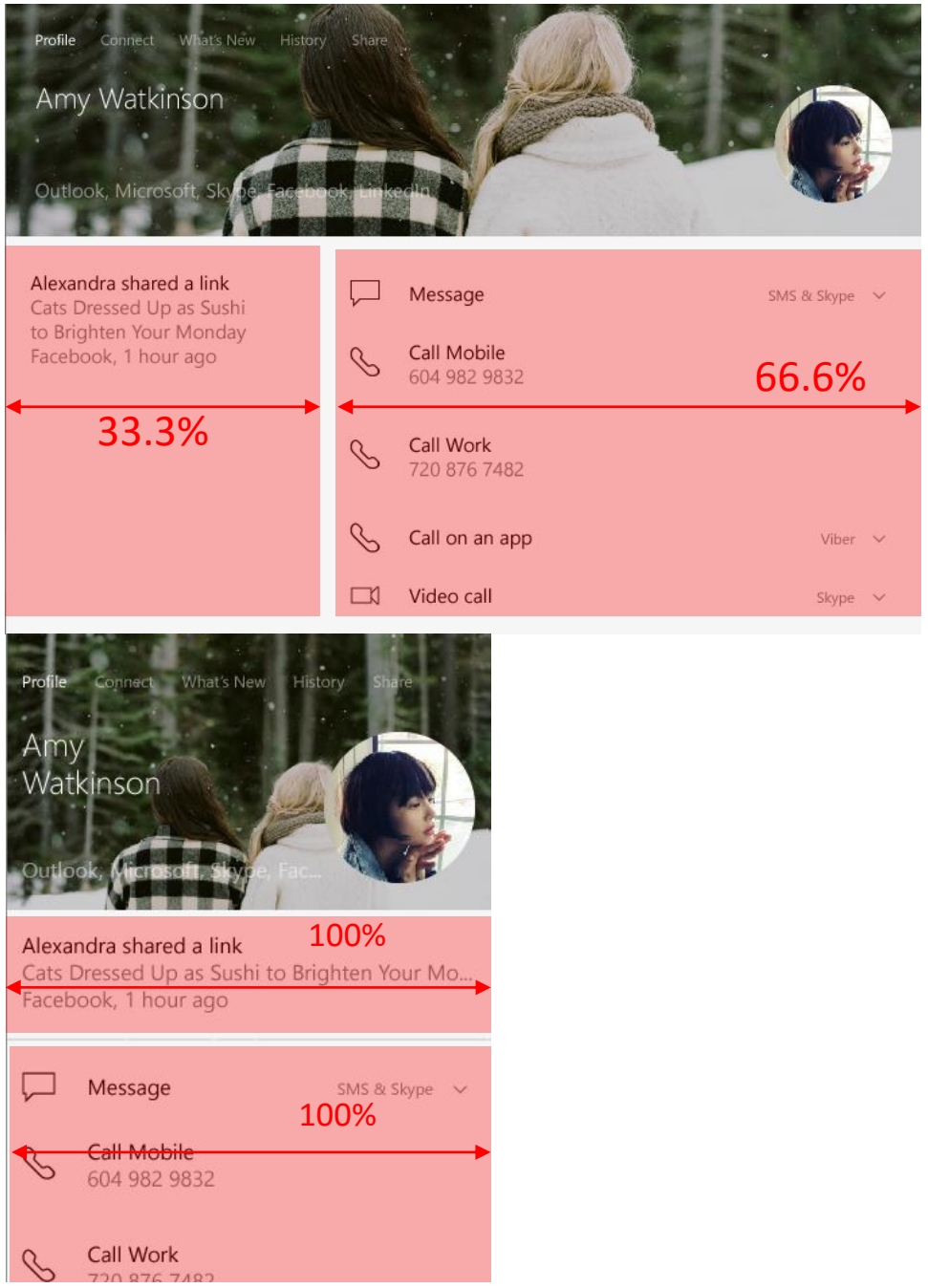
Responsive UI

Reposition



Responsive UI

Reposition



Adaptive Triggers

```
<VisualState>
        <!-- VisualState to be triggered when window width is >768 effective pixel-->
        <VisualState.StateTriggers>
                <AdaptiveTrigger MinWindowWidth=“769" />
        </VisualState.StateTriggers>
        <VisualState.Setters>
                <Setter Target="Button1.Content” Value="Wide"/>
        </VisualState.Setters>
</VisualState>

<VisualState>
        <!-- VisualState to be triggered when window width is between 0 to 768 effective pixels-->
        <VisualState.StateTriggers>
                <AdaptiveTrigger MinWindowWidth="0" />
        </VisualState.StateTriggers>
        <VisualState.Setters>
                 <Setter Target="Button1.Content” Value=“Narrow"/>
```

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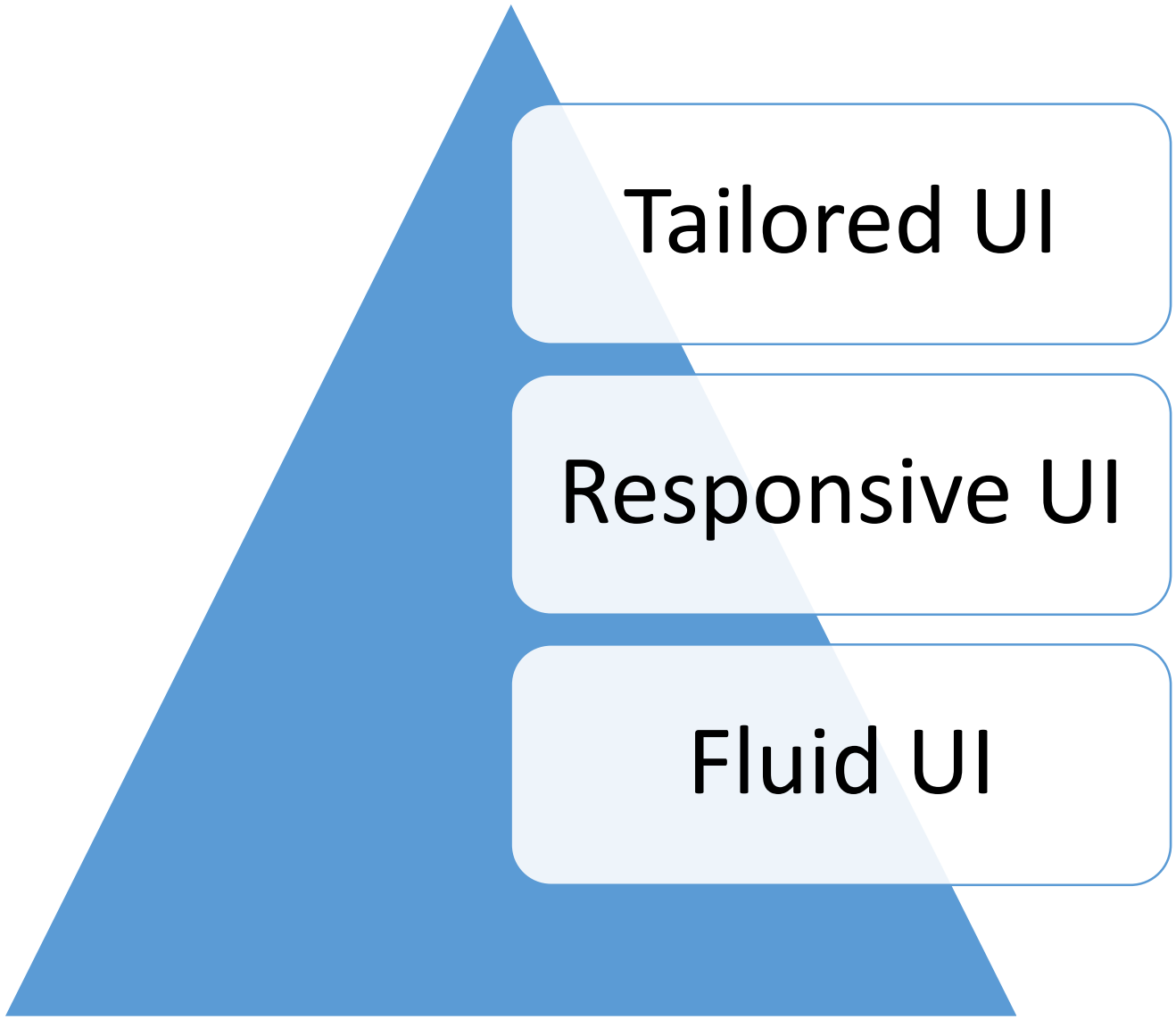
```

Example

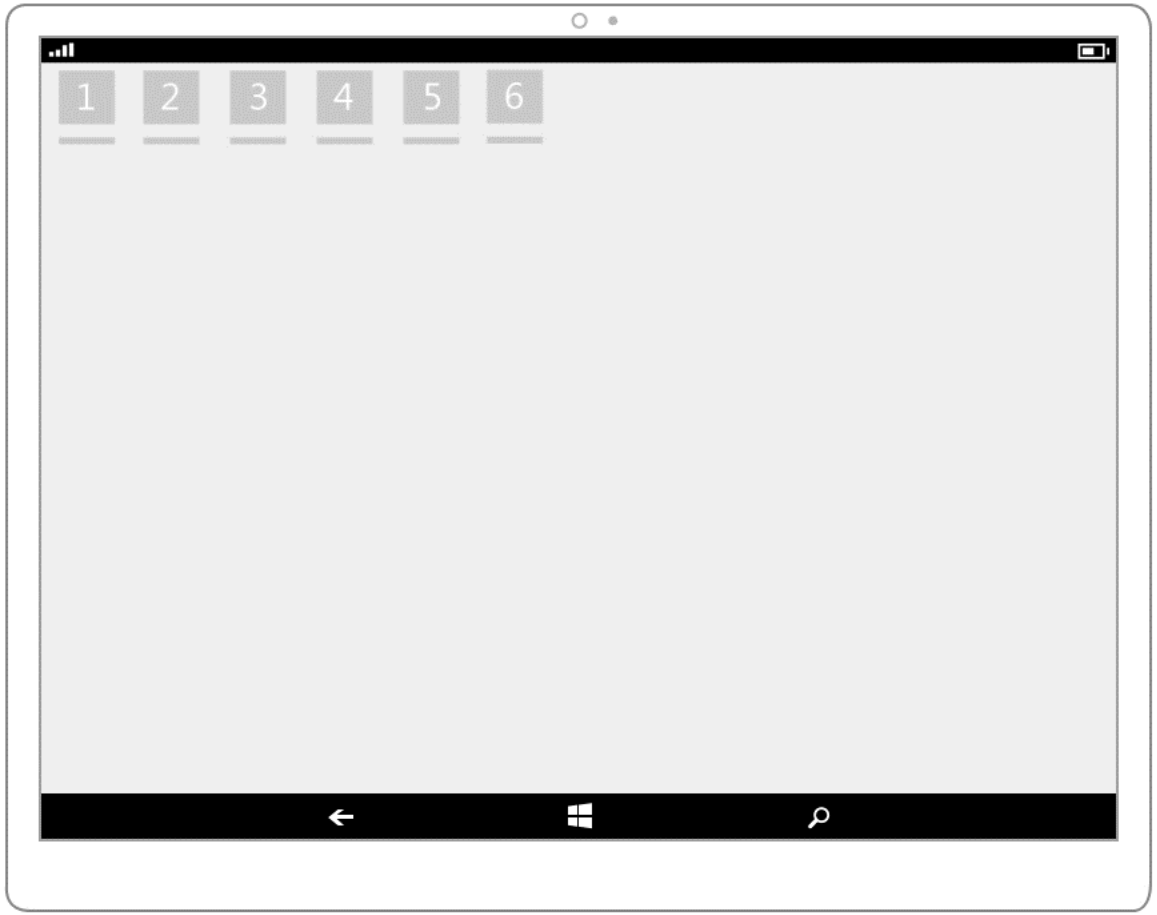

LTE
12:55
Connected to Actiontec Pro
tap to control
COLLECTION
ALBUMS
Desert photos
10/5
7 items
10/2
18 items


No item selected
April 2015
4/27 9 items
4/22 27 items
4/21 10 items
4/18 21 items
4/15 8 items


Tailored UI
Responsive UI
Fluid UI

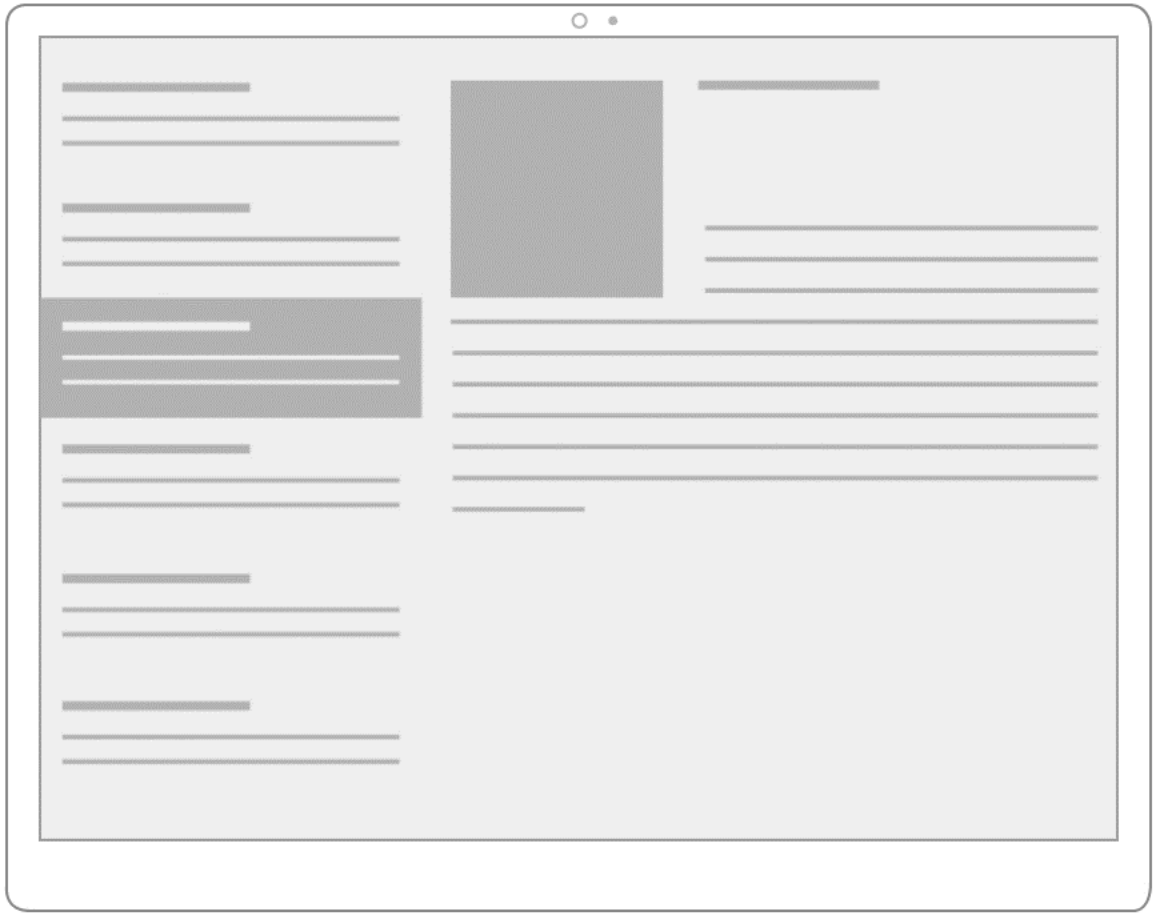
Tailored UI

Replace controls and UI elements.



Tailored UI

Re-architect the navigation and layout of your application.



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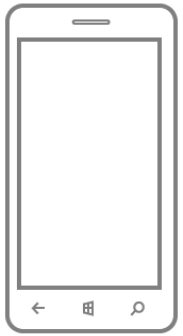
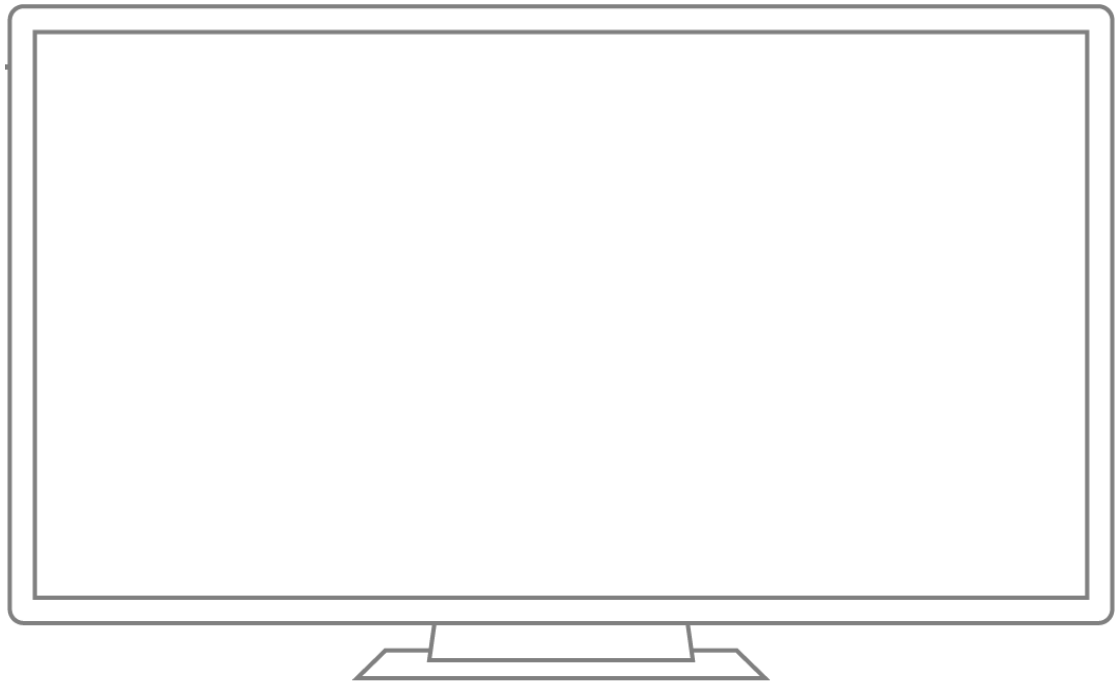
UserInteractionMode API

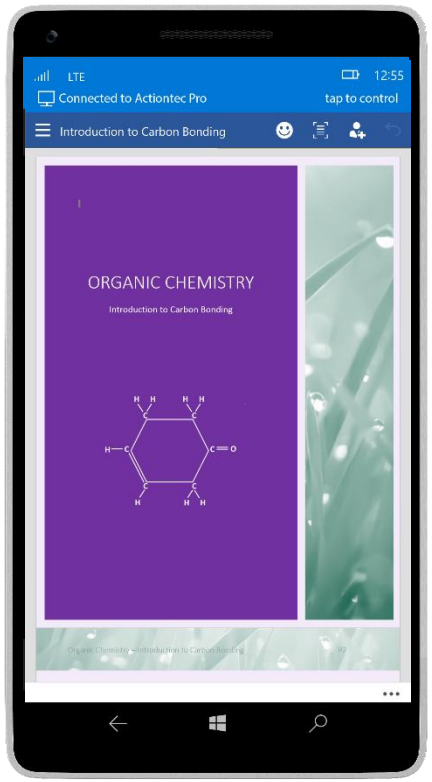


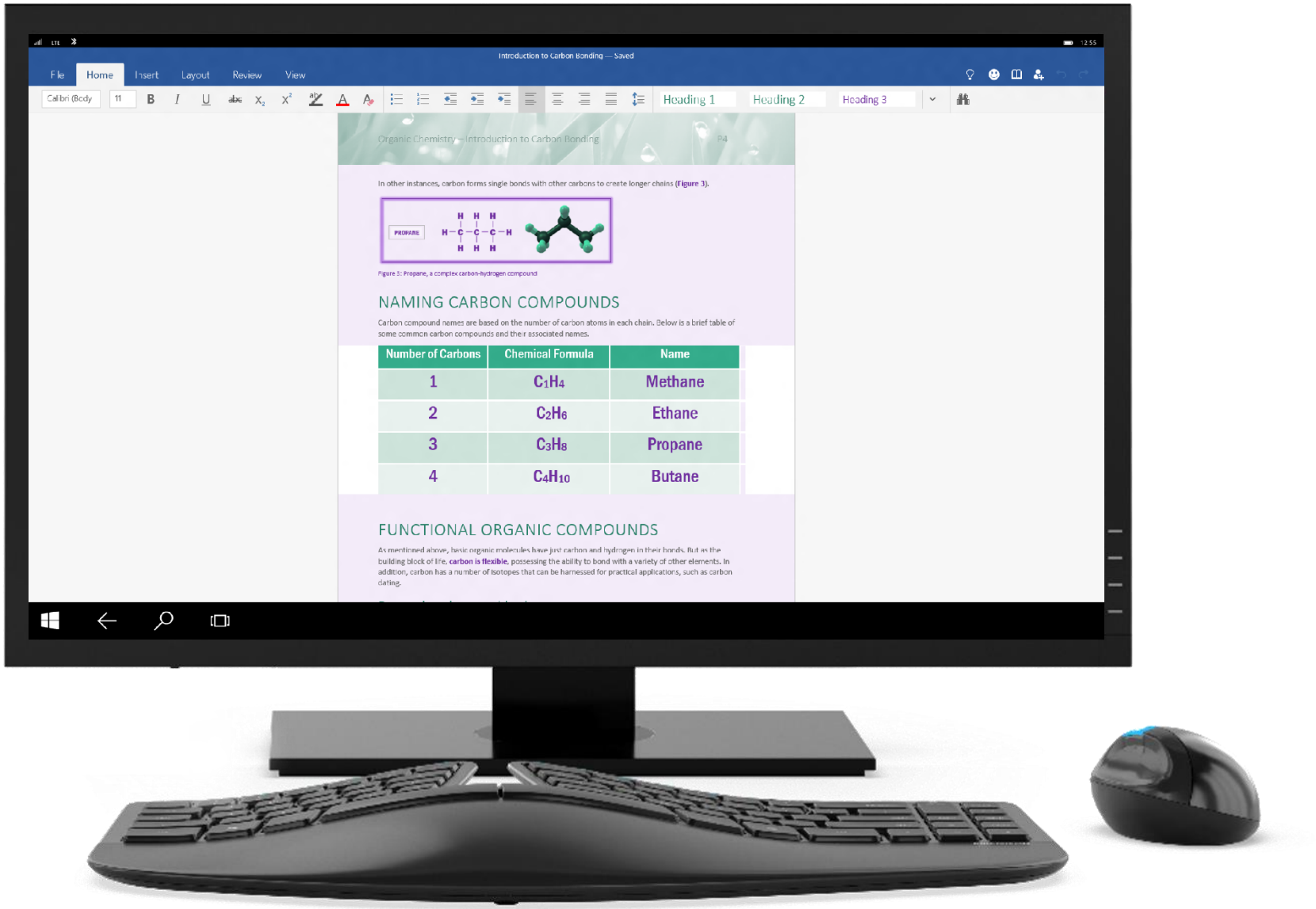
"Phone Optimized UI"
UserInteractionMode.Touch



"Big Screen Optimized UI"
UserInteractionMode.Mouse

Example


LTE
12:55
Connected to Actiontec Pro
tap to control
Introduction to Carbon Bonding
ORGANIC CHEMISTRY
Introduction to Carbon Bonding


Introduction to Carbon Bonding — Saved
File
Home
Insert
Layout
Review
View
Heading 1
Heading 2
Heading 3
Organic Chemistry – Introduction to Carbon Bonding
In other instances, carbon forms single bonds with other carbons to create longer chains (Figure 3).
PROPANE
Figure 3: Propane, a complex carbon-hydrogen compound
NAMING CARBON COMPOUNDS
Carbon compound names are based on the number of carbon atoms in each chain. Below is a brief table of some common carbon compounds and their associated names.
Number of Carbons
Chemical Formula
Name
1
C1H4
Methane
2
C2H6
Ethane
3
C3H8
Propane
4
C4H10
Butane
FUNCTIONAL ORGANIC COMPOUNDS
As mentioned above, basic organic molecules have just carbon and hydrogen in their bonds. But as the building block of life, carbon is flexible, possessing the ability to bond with a variety of other elements. In addition, carbon has a number of isotopes that can be harnessed for practical applications, such as carbon dating.

Mobile-Only App Package

Default

App will reflow and adapt to any display

Mobile-Only App Package

Default	A little work
App will reflow and adapt to any display	Further optimize large screen layout

Mobile-Only App Package

Default	A little work	More work
App will reflow and adapt to any display	Further optimize large screen layout	Build a Universal Windows App

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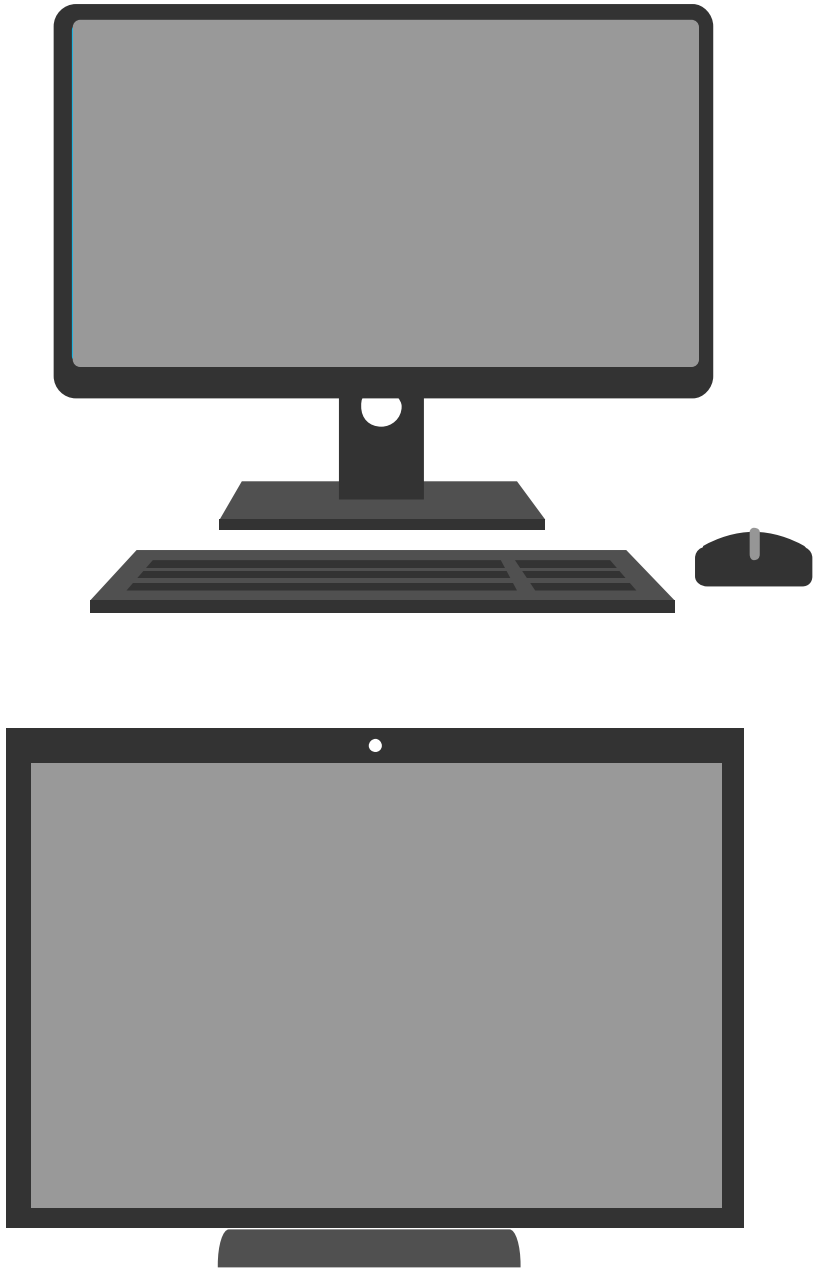
Separate App Packages

Default	A little work	More work
Mobile app will reflow and adapt to any display	Further optimize large screen layout	Build a Universal Windows App

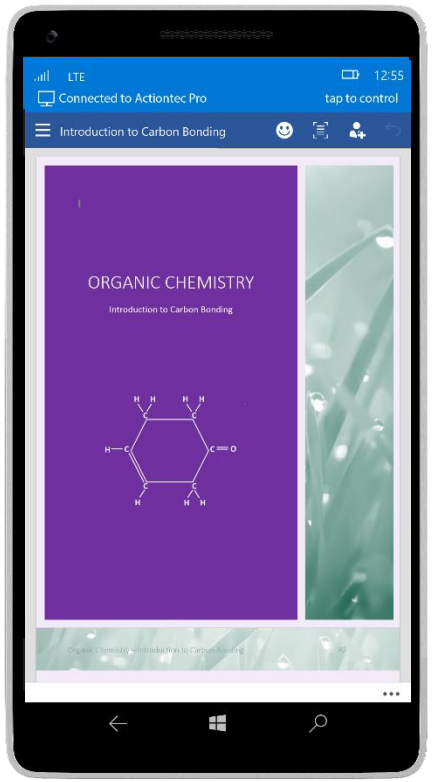
Separate App Packages

Default	**A little work**	**More work**
Mobile app will reflow and adapt to any display	Further optimize large screen layout	Build a Universal Windows App **Pull PC views/assets into mobile package**



Including assets for multiple scales improves the appearance of your app across screens.

Example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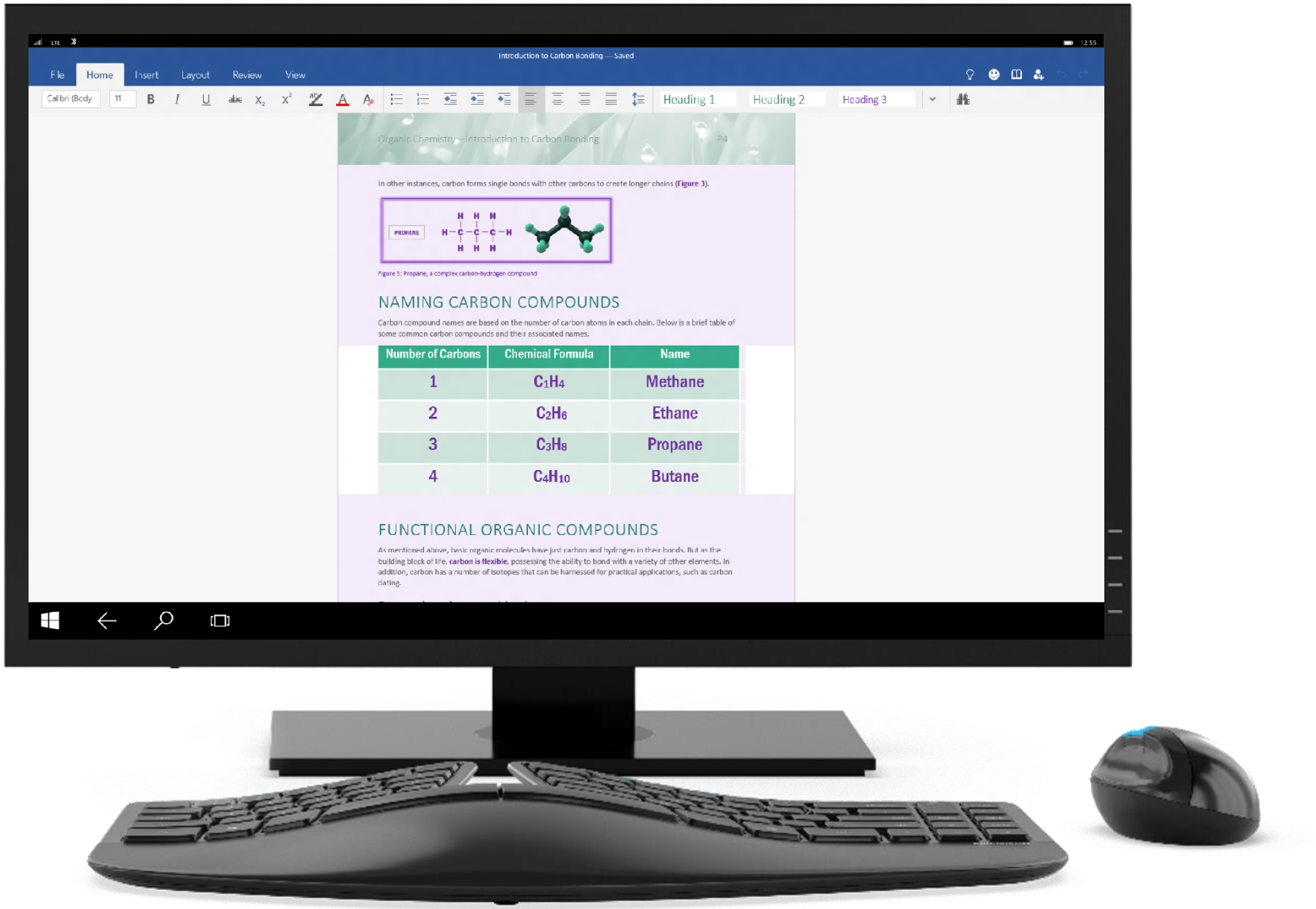
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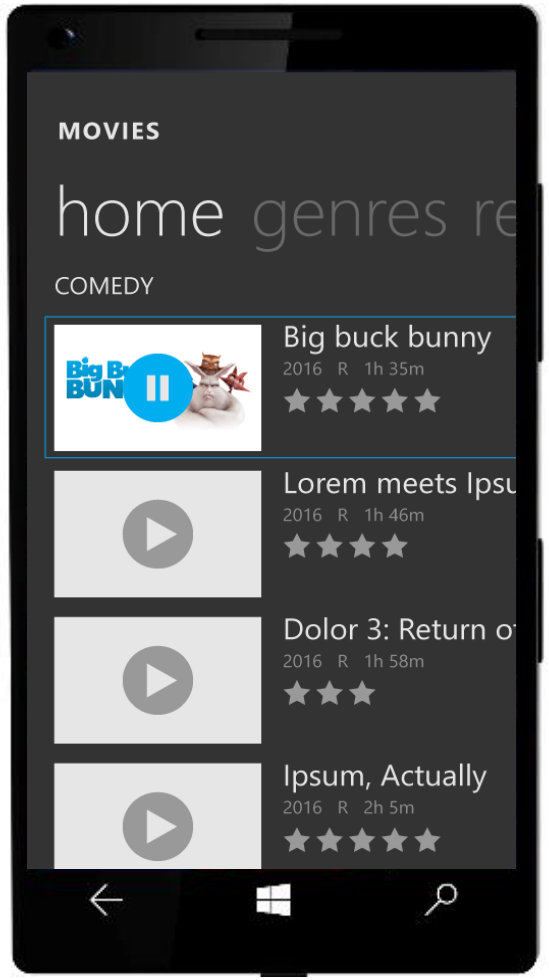
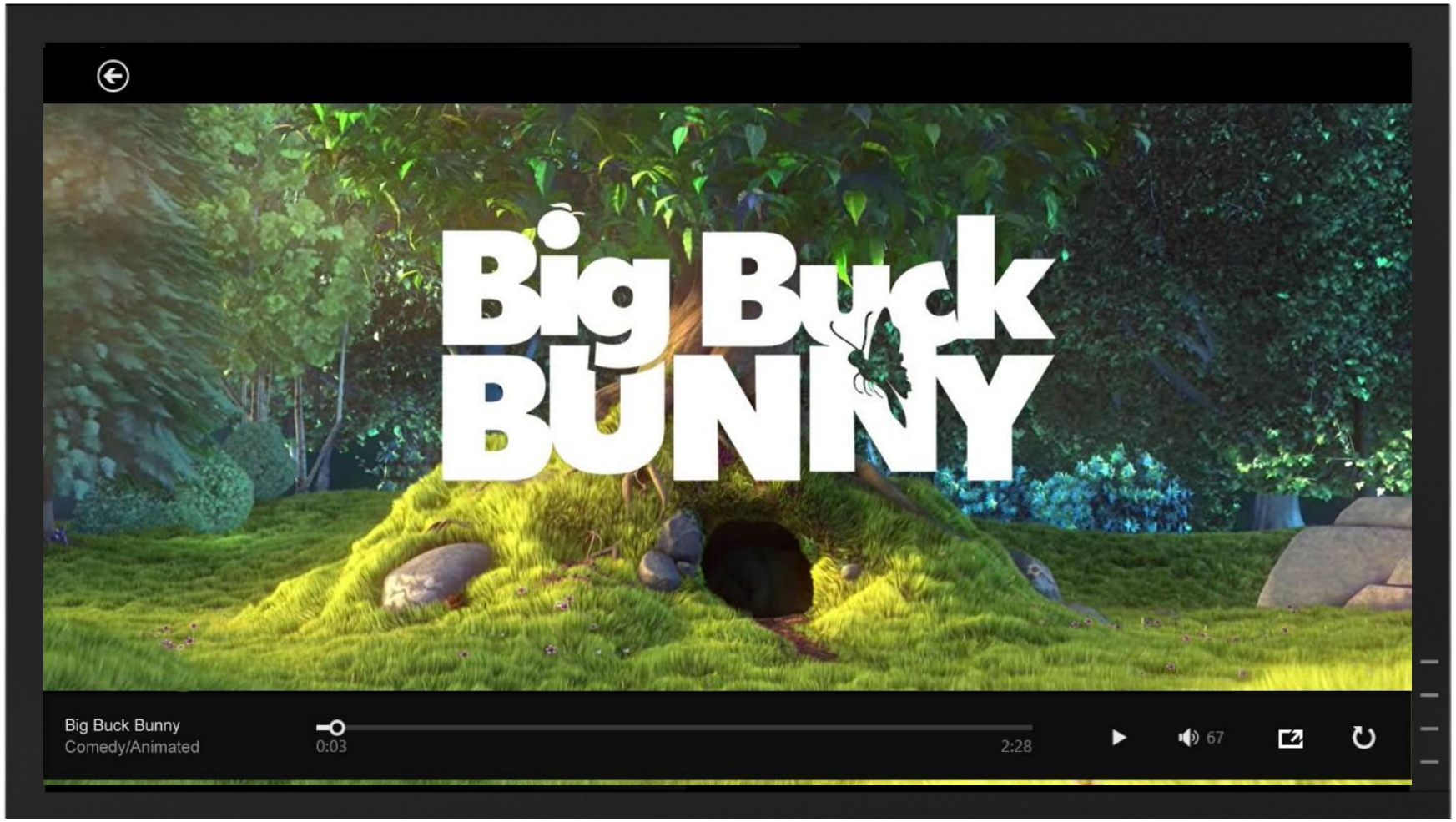
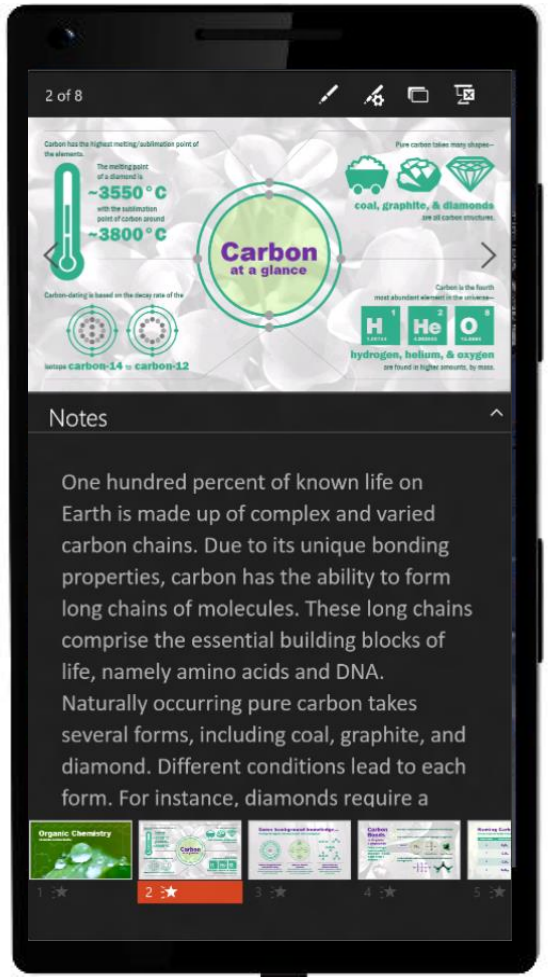
Take advantage of the phone and big screen simultaneously.

Cast API


MOVIES
home genres re
COMEDY
Big buck bunny
2016 R 1h 35m
Lorem meets Ipsu
2016 R 1h 46m
Dolor 3: Return o
2016 R 1h 58m
Ipsum, Actually
2016 R 2h 5m


Big Buck BUNNY
Big Buck Bunny
Comedy/Animated
0:03
2:28
67

ProjectionManager API



Future directions

Future directions:
Very large physical displays (80”+)

Future directions:
Virtual displays (HoloLens)

Future directions:
Voice-driven interaction

Future directions:
Disaggregated inputs, sensors, outputs

Future directions:
Multi-user interaction

Questions?

& thanks

Abolade Gbadegesin
Software Engineer, Windows