#WWDC18

Accessible Drag and Drop

Session 241

Conor Hughes, iOS Accessibility

Agenda

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1. Drag and Drop refresher

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2. Accessible Drag and Drop concepts

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2. Accessible Drag and Drop concepts
3. Example—Exposing an ancestor’s drag

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2. Accessible Drag and Drop concepts
3. Example—Exposing an ancestor’s drag
4. Example—Exposing multiple drops

Drag and Drop Refresher

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Interactions are hosted by views

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Starting a drag: `UIDragInteraction`

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Solution

Accessible Drag and Drop Concepts

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- Subviews might host interactions
- Element might descend from a view that hosts interactions

Solution

- Specify logical drags and drops to Accessibility

Accessible Drag and Drop Concepts

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`UIAccessibilityDragging:` Logical drag sources and drop points

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- Drag sources describe where to start drags

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Users activate drags and drops like custom actions

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`UIAccessibilityDragging:` Logical drag sources and drop points

- Drag sources describe where to start drags
- Drop points describe where to drop

Users activate drags and drops like custom actions

```
extension NSObject {
    @available(iOS 11.0, *)
    open var accessibilityDragSourceDescriptors: [UIAccessibilityLocationDescriptor]?

    @available(iOS 11.0, *)
    open var accessibilityDropPointDescriptors: [UIAccessibilityLocationDescriptor]?
}
```

Accessible Drag and Drop Concepts

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`UIAccessibilityDragging`

- Allows exposing exactly the interactions that make sense
- Allows specifying a specific name for each
- Implement for the best experience

Exposing an Ancestor’s Drag

Example

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Bar graph built with `CALayer`

Exposing an Ancestor’s Drag

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Bar graph built with `CALayer`

Drag and drop bar data by dragging the bar itself

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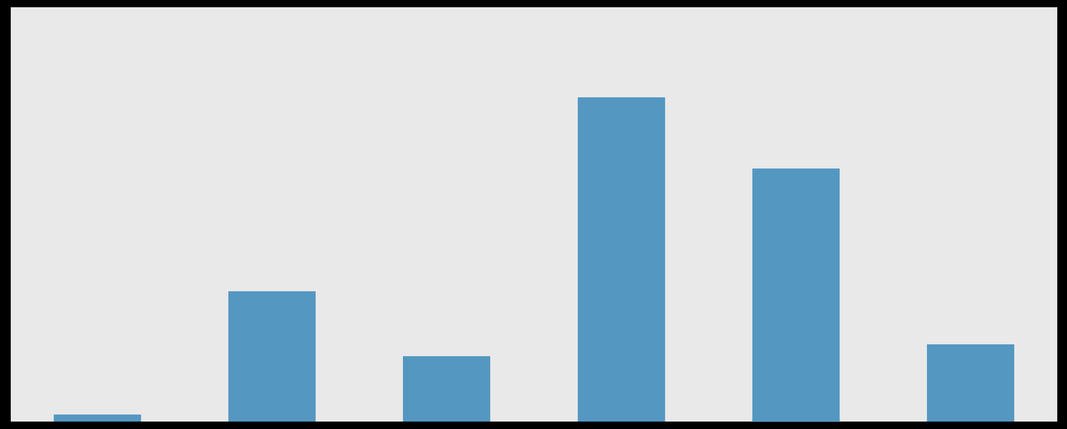

Exposing an Ancestor's Drag

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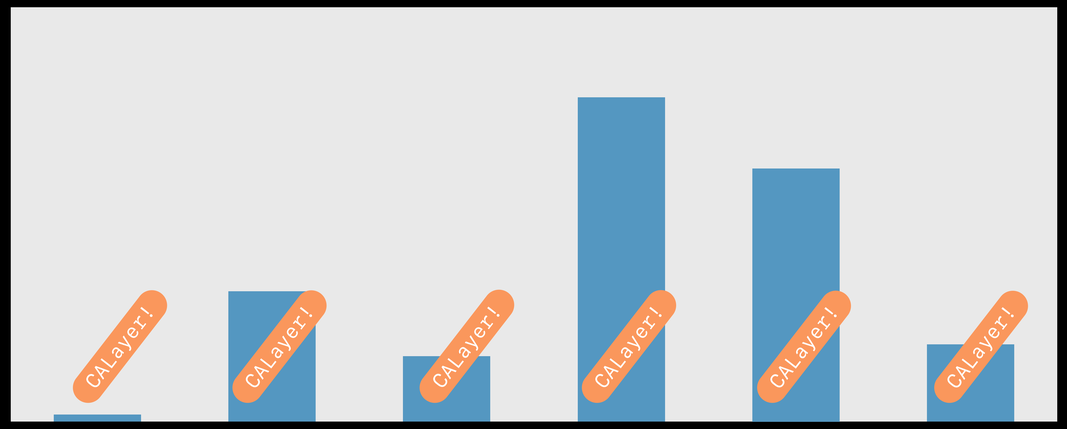
Bar graph built with `CALayer`

Drag and drop bar data by dragging the bar itself



```
func dragInteraction(_ interaction: UIDragInteraction,
                     itemsForBeginning session: UIDragSession) -> [UIDragItem] {
    if let index = self.indexOfBar(point: session.location(in: self)) {
        let provider = NSItemProvider(object: "Bar: \(series[index])" as NSString)
        let dragItem = UIDragItem(itemProvider: provider)
        dragItem.localObject = index
        return [dragItem]
    }
    return []
}
```

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        return [dragItem]
    }
    return []
}
```

```
func makeAccessibilityElements() {
    self.accessibilityElements = bars.enumerated().map { (index, barLayer) in
        let element = UIAccessibilityElement(accessibilityContainer: self)
        element.accessibilityFrameInContainerSpace = barLayer.frame
        element.accessibilityLabel = seriesLabels[index]
        element.accessibilityValue = "\(series[index])"
        return element
    }
}
```

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    self.accessibilityElements = bars.enumerated().map { (index, barLayer) in
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UIAccessibilityLocationDescriptor

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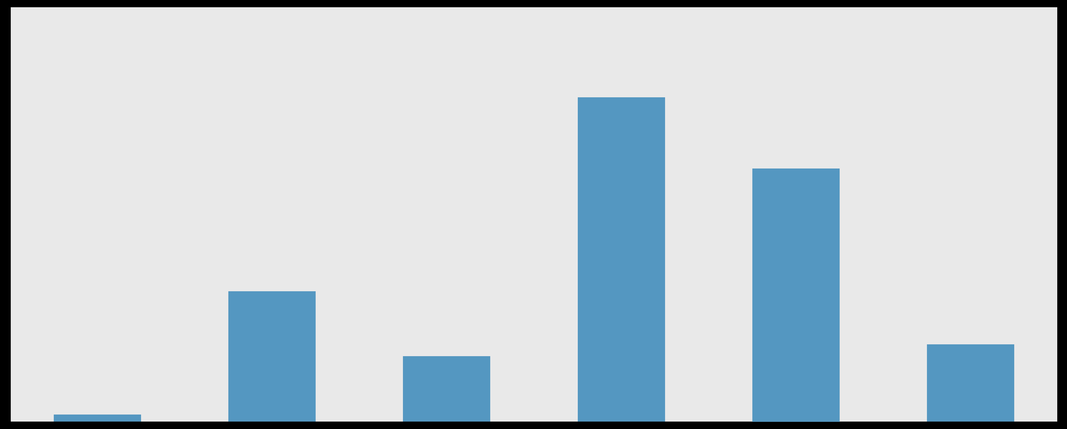

UIAccessibilityLocationDescriptor

Names and describes where to activate an interaction

- A point
- In a view
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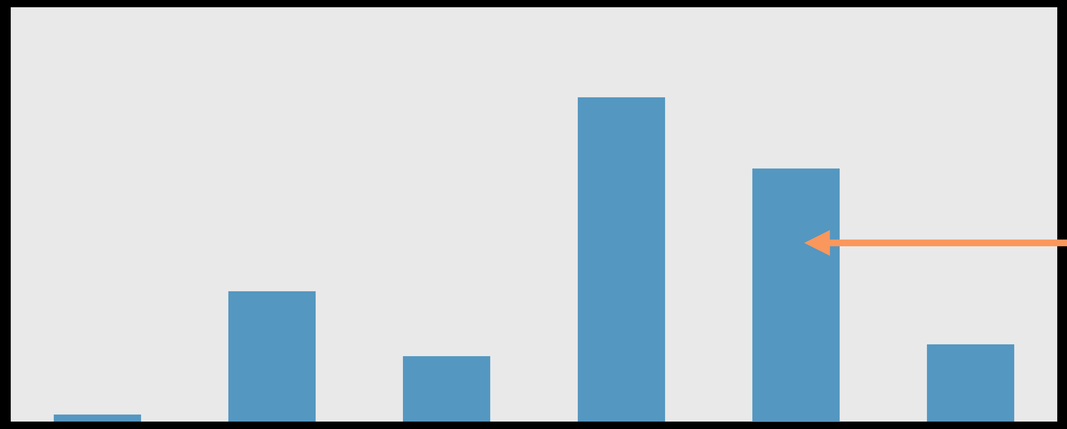

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- Expose drag sources logically associated with this element

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accessibilityDragSourceDescriptors and accessibilityDropPointDescriptors

`accessibilityDragSourceDescriptors`

- Expose drag sources logically associated with this element

`accessibilityDropPointDescriptors`

- Expose drop points logically associated with this element

Descriptors must reference the views with the relevant interaction

```
let descriptor = UIAccessibilityLocationDescriptor(name: “Drag from specified point",
                                                   point: dragPoint, in: view)
element.accessibilityDragSourceDescriptors = [descriptor]
```

```
func makeAccessibilityElements() {
    self.accessibilityElements = bars.enumerated().map { (index, barLayer) in
        let element = UIAccessibilityElement(accessibilityContainer: self)
        element.accessibilityFrameInContainerSpace = barLayer.frame
        element.accessibilityLabel = seriesLabels[index]
        element.accessibilityValue = "\(series[index])"




        return element
    }
}
```

```
func makeAccessibilityElements() {
    self.accessibilityElements = bars.enumerated().map { (index, barLayer) in
        let element = UIAccessibilityElement(accessibilityContainer: self)
        element.accessibilityFrameInContainerSpace = barLayer.frame
        element.accessibilityLabel = seriesLabels[index]
        element.accessibilityValue = "\(series[index])"
        let dragPoint = CGPoint(x: barLayer.frame.midX, y: barLayer.frame.midY)
        let descriptor = UIAccessibilityLocationDescriptor(name: "Drag bar data",
                                                           point:dragPoint, in: self)
        element.accessibilityDragSourceDescriptors = [descriptor]
        return element
    }
}
```

Exposing Multiple Drops

Example

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Example

Contact card

Exposing Multiple Drops

Example

Contact card

Exposing Multiple Drops

Example

Contact card

- Card is one element

Exposing Multiple Drops

Example

Contact card

- Card is one element
- Drop into multiple “wells” in the card

Exposing Multiple Drops

Example

Contact card

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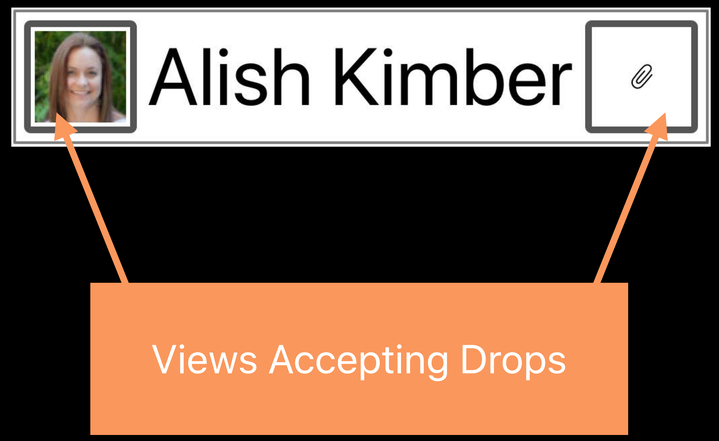
- Drop into multiple “wells” in the card



```
override var accessibilityDropPointDescriptors: [UIAccessibilityLocationDescriptor]? {
    get {
        let photoWellMidpoint = CGPoint(x: self.contactPhotoWell.bounds.midX,
                                        y: self.contactPhotoWell.bounds.midY)
        let attachmentsWellMidpoint = CGPoint(x: self.attachmentsWell.bounds.midX,
                                              y: self.attachmentsWell.bounds.midY)
        return [UIAccessibilityLocationDescriptor(name: "Drop into portrait",
                                                  point: photoWellMidpoint,
                                                  in: self.contactPhotoWell),
                UIAccessibilityLocationDescriptor(name: "Drop into attachments",
                                                  point: attachmentsWellMidpoint,
                                                  in:self.attachmentsWell)]
    }
    set {}
}
```

```
override var accessibilityDropPointDescriptors: [UIAccessibilityLocationDescriptor]? {
    get {
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    get {
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}
```

Summary

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Expose the drags and drops associated with your elements to Accessibility

Summary

Expose the drags and drops associated with your elements to Accessibility

`accessibilityDragSourceDescriptors` for drags

Summary

Expose the drags and drops associated with your elements to Accessibility

`accessibilityDragSourceDescriptors` for drags

`accessibilityDropPointDescriptors` for drops

Summary

Expose the drags and drops associated with your elements to Accessibility

`accessibilityDragSourceDescriptors` for drags

`accessibilityDropPointDescriptors` for drops

`UIAccessibilityLocationDescriptor` describes drags and drops to Accessibility

More Information

https://developer.apple.com/wwdc18/241


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