



Xamarin Evolve 2014

Homeward Bound: Implementing Android Navigation Patterns

Michael Stonis

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Common Android Navigation Patterns



Stack Navigation



Tab Navigation



Navigation Drawer

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Common Android Navigation Patterns



Stack Navigation



Tab Navigation



Navigation Drawer

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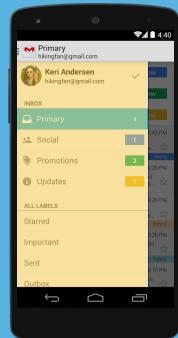
Common Android Navigation Patterns



Stack Navigation



Tab Navigation



Navigation Drawer

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Android 4+ and the Action Bar

Action “Ice Cream” Bar

- Android 4.0 brings the Action Bar to phones



- The Action Bar provides context sensitive navigation and menus



- The Action Bar can be added to Android devices all the way back to 2.1

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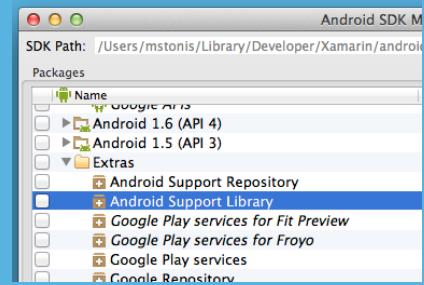
Android Support Library

New Android Features for Old Devices

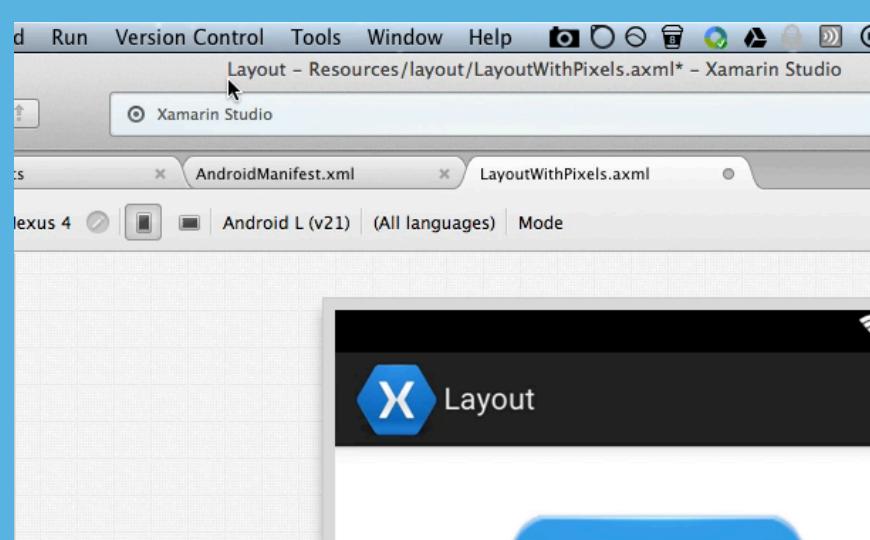
- Brings new Features to Android 1.6+

- New Components Include
 - Action Bar
 - Fragments
 - Rich Notifications

- Early Design and Pre-Release Features

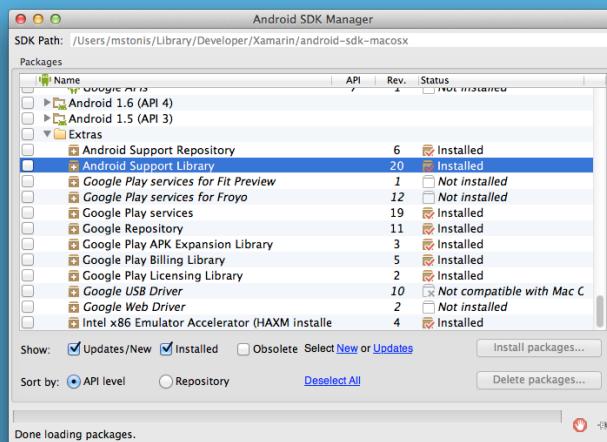


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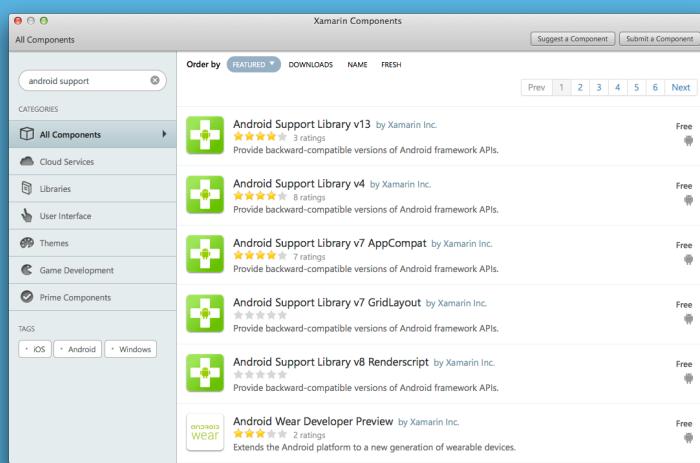
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Android Support Library



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Android Support Library



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Stack Navigation

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Stack Navigation

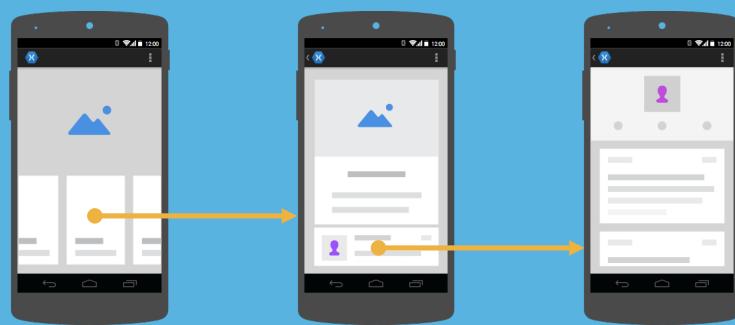
- Standard Navigation
- Three General Types
 - Forward Navigation
 - Back Navigation
 - Up Navigation

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Forward Navigation

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Forward Navigation



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Forward Navigation

Moving From One Interface to Another

- Navigating forward will add the previous activity onto the back stack
- This is most commonly performed using an *Intent*

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Starting an Activity with an Intent

```
var intent = new Intent(this, typeof(SessionActivity));  
intent.PutExtra("Title", title);  
StartActivity(intent);
```

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Starting an Activity with an Intent

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Back Navigation

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Back Navigation

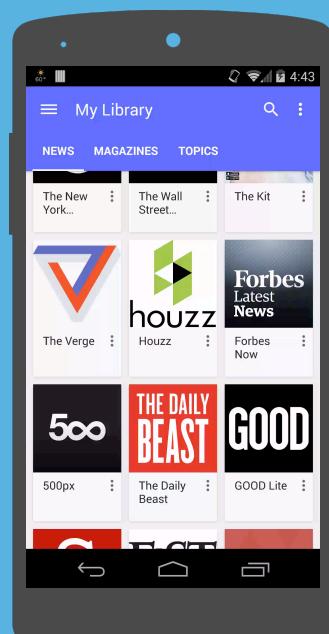


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Back Navigation



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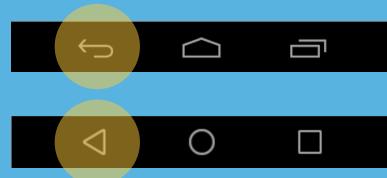


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Back Navigation

Moving back to the last Activity

- All Android devices provide either hardware or software-rendered back buttons
- Screen progression tracked by default, so no additional work to implement

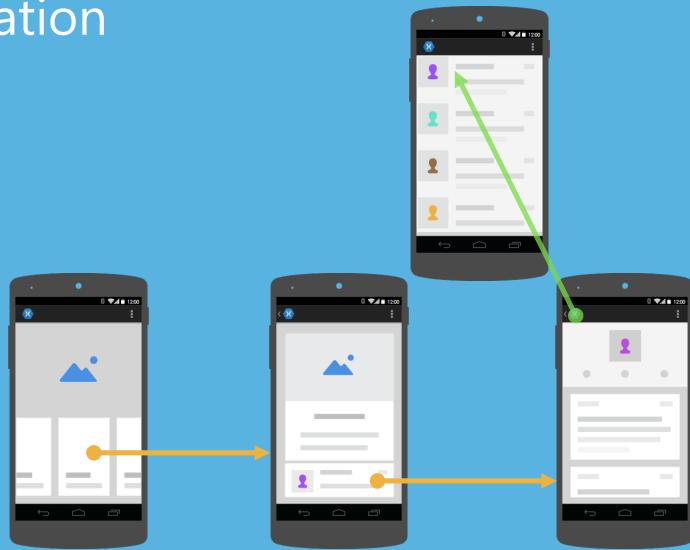


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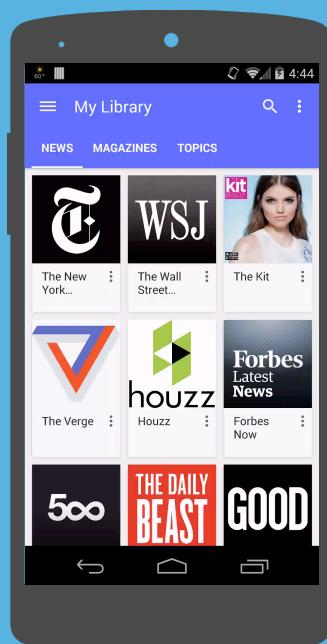
Up Navigation

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Up Navigation



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Up Navigation

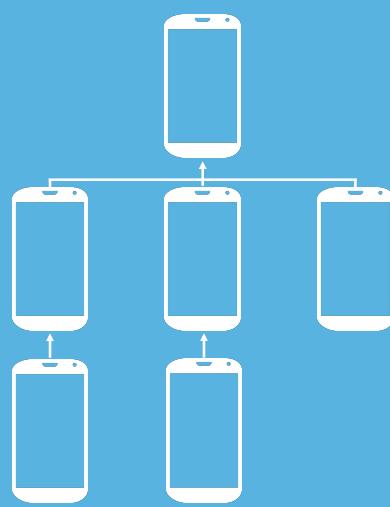
Navigating Back Up the Application's Hierarchy

- Navigation back to your App's main or home screen
- Consistent navigation for your applications hierarchy
- Your interface will need an Action Bar to properly implement it



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App Hierarchy



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Specifying Activity Parents

```
[Activity (Label = "Session", ParentActivity = typeof(SessionsActivity))]
//Add Metadata to support Android 4.0 and lower
[MetaData("android.support.PARENT_ACTIVITY", Value = "com.xamarin.university.SessionsActivity")]
public class SessionActivity : Activity
{
    protected override void OnCreate (Bundle bundle)
    {
```

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Specifying Activity Parents

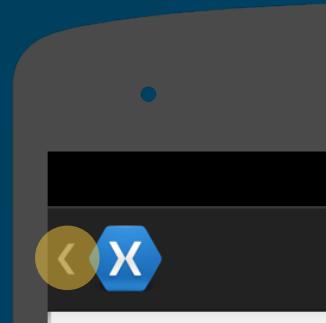
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[Activity (Label = "Session", ParentActivity = typeof(SessionsActivity))]
//Add Metadata to support Android 4.0 and lower
[MetaData("android.support.PARENT_ACTIVITY", Value = "com.xamarin.university.SessionsActivity")]
public class SessionActivity : Activity
{
    protected override void OnCreate (Bundle bundle)
    {
```

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Adding Up Navigation

```
protected override void OnCreate (Bundle bundle)
{
    base.OnCreate (bundle);
    SetContentView (Resource.Layout.Main);

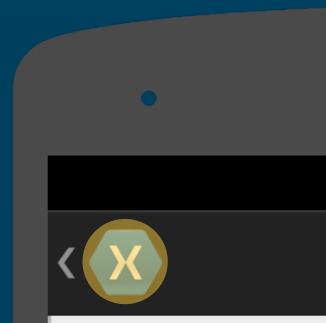
    ActionBar.SetDisplayHomeAsUpEnabled (true);
    ActionBar.SetHomeButtonEnabled (true);
}
```



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Responding to Up Navigation

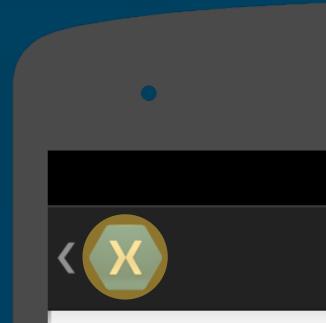
```
public override bool OnOptionsItemSelected (IMenuItem item)
{
    switch (item.ItemId) {
        case Android.Resource.Id.Home:
            NavUtils.NavigateUpFromSameTask (this);
        default:
            break;
    }
}
```



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Responding to Up Navigation

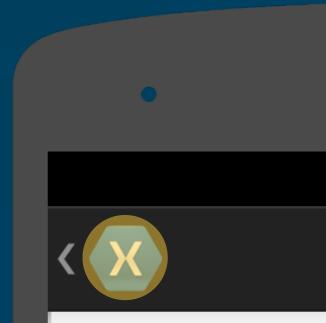
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Responding to Up Navigation

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        default:
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}
```



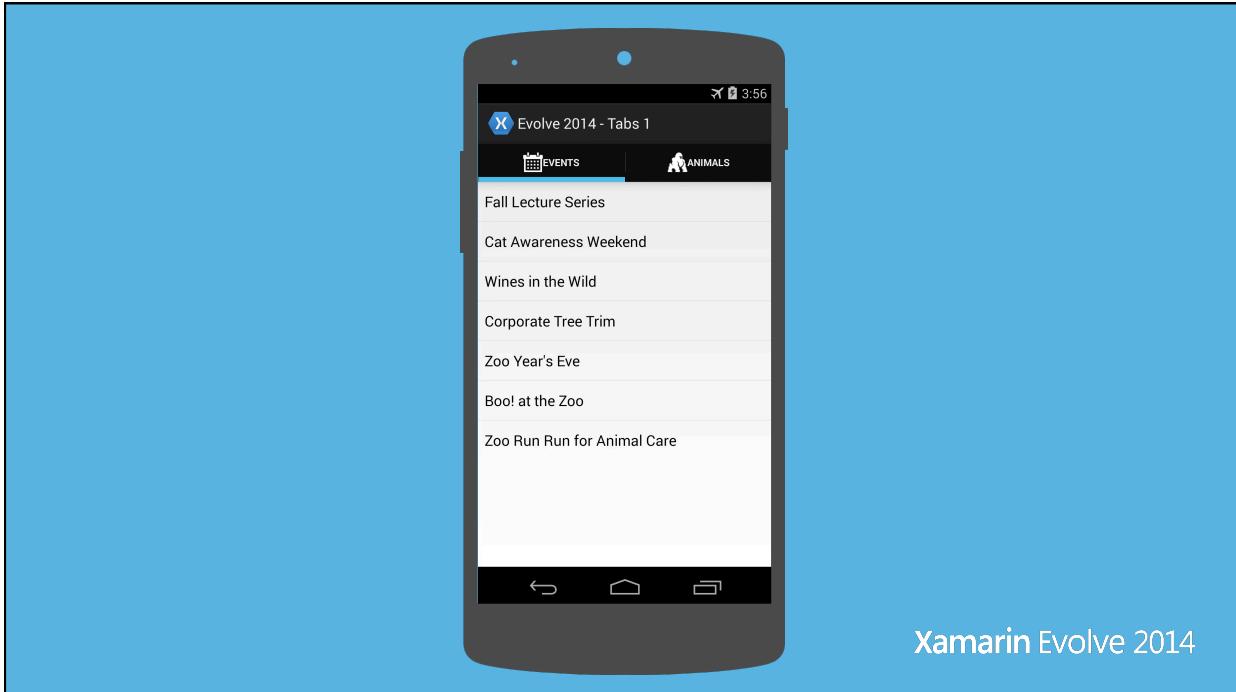
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Tab Navigation

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Demo

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Tab Navigation

- Quick navigation between application functionality
- Best for 3-4 content tabs
- Will need to target Android 4+ or have the support library installed

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Tab Navigation

Required Steps

- Implement the ITabListener Interface
- Add tabs to our Action Bar
- Listen for tab switched tabs

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Adding Tab Functionality

```
public class MainActivity : ActionBarActivity, ActionBar.ITabListener
{
    public void OnTabSelected (ActionBar.Tab tab, FragmentTransaction ft)
    {
        Log.Debug (Tag, "The tab {0} as been selected.", tab.Text);
    }

    public void OnTabUnselected (ActionBar.Tab tab, FragmentTransaction ft)
    {
        Log.Debug (Tag, "The tab {0} as been unselected.", tab.Text);
    }

    public void OnTabReselected (ActionBar.Tab tab, FragmentTransaction ft)
    {
        Log.Debug (Tag, "The tab {0} was re-selected.", tab.Text);
    }
}
```

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Adding Tab Functionality

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public class MainActivity : ActionBarActivity, ActionBar.ITabListener
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    public void OnTabSelected (ActionBar.Tab tab, FragmentTransaction ft)
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    }

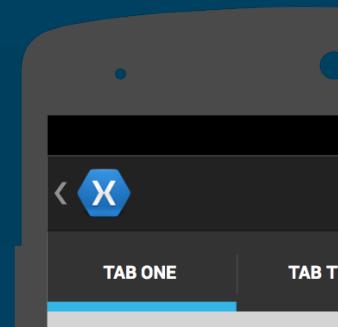
    public void OnTabReselected (ActionBar.Tab tab, FragmentTransaction ft)
    {
        Log.Debug (Tag, "The tab {0} was re-selected.", tab.Text);
    }
}
```

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Adding Tabs

```
void AddTabToActionBar (int labelResourceId, int iconResourceId)
{
    var tab =
        ActionBar.NewTab ()
            .SetText (labelResourceId)
            .SetIcon (iconResourceId)
            .SetTabListener (this);

    ActionBar.AddTab (tab);
}
```

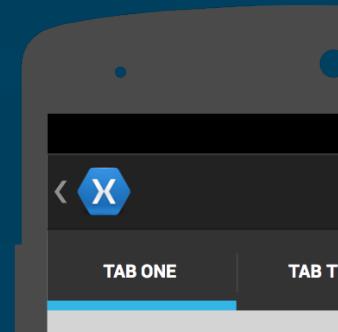


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Adding Tabs

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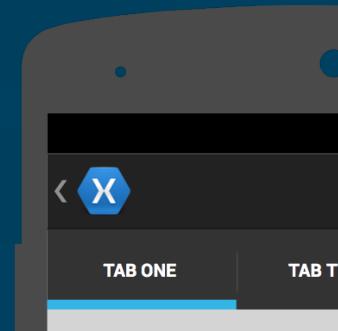


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Adding Tabs

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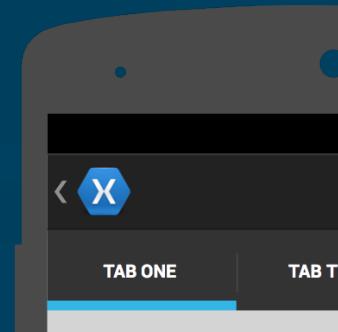


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Adding Tabs

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}
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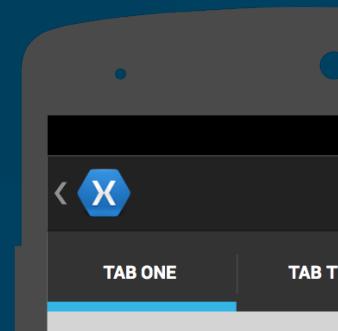


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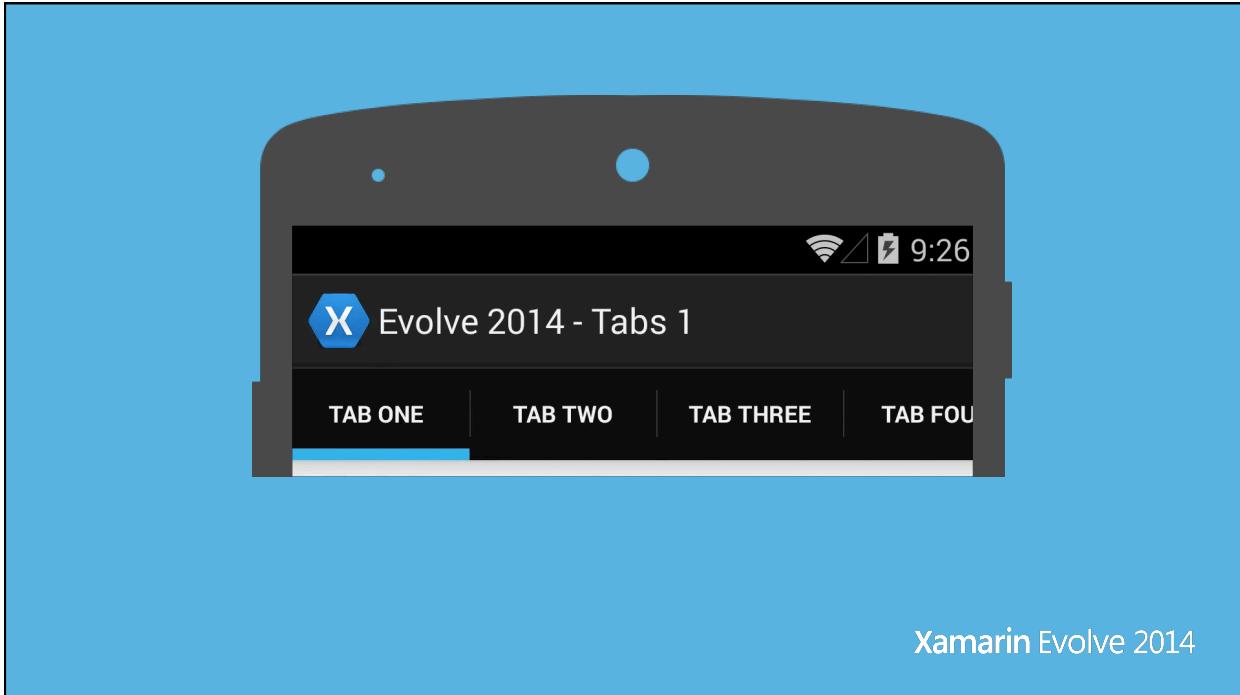
Adding Tabs

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            .SetText (labelResourceId)
            .SetIcon (iconResourceId)
            .SetTabListener (this);

    ActionBar.AddTab (tab);
}
```



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Switching Tabs

```
public void OnTabReselected (ActionBar.Tab tab, FragmentTransaction ft)
{
    Log.Debug (Tag, "The tab {0} was re-selected.", tab.Text);
}

public void OnTabSelected (ActionBar.Tab tab, FragmentTransaction ft)
{
    SupportFragmentManager.PopBackStackImmediate ();

    Fragment frag = _fragments [tab.Position];
    ft.Replace (Resource.Id.content_frame, frag);

    Log.Debug (Tag, "The tab {0} has been selected.", tab.Text);
}

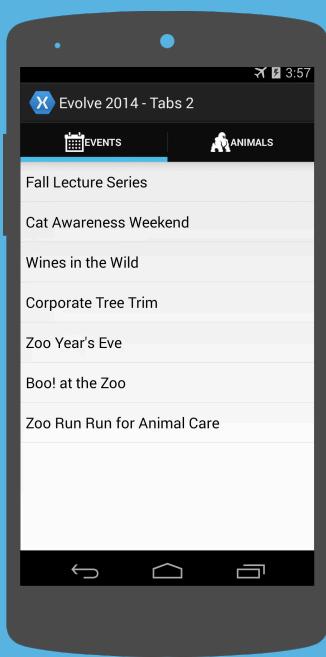
public void OnTabUnselected (ActionBar.Tab tab, FragmentTransaction ft)
{
    // perform any extra work associated with saving fragment state here.
    Log.Debug (Tag, "The tab {0} has been unselected.", tab.Text);
}
```

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Demo

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ViewPager for Tabs

Required Steps

- Add a ViewPager element to your Layout XML
- Create an Adapter to host your different content
- Implement the IOnPageChangeListener Interface

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Building a Better Tab Host

```
<?xml version="1.0" encoding="utf-8"?>
<android.support.v4.view.ViewPager
    xmlns:android="http://schemas.android.com/apk/res/android"
        android:minWidth="25px"
        android:minHeight="25px"
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:id="@+id/content_frame" />
```



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Create a tab Adapter

```
class TabAdapter : FragmentStatePagerAdapter
{
    Fragment[] _fragments;

    public TabAdapter(FragmentManager fragmentManager) : base(fragmentManager){
        _fragments = new Fragment[] { /* List of Fragments */ } ;
    }

    public override int Count {
        get { return _fragments.Length; }
    }

    public override Fragment GetItem (int position)
    {
        if (position < 0 || position > _fragments.Length - 1)
            return null;
        return _fragments [position];
    }
}
```

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Create a tab Adapter

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    public TabAdapter(FragmentManager fragmentManager) : base(fragmentManager)
    {
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    public override Fragment GetItem (int position)
    {
        if (position < 0 || position > _fragments.Length - 1)
            return null;

        return _fragments [position];
    }
}
```

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Implement ViewPager in Activity

```
public class MainActivity : ActionBarActivity, ActionBar.ITabListener, ViewPager.IOnPageChangeListener
{
    public void OnPageScrollStateChanged (int state)
    {}

    public void OnPageScrolled (int position, float positionOffset, int positionOffsetPixels)
    {}

    public void OnPageSelected (int position)
    {
        ActionBar.setSelectedNavigationItem (position);
    }
}
```

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Implement ViewPager in Activity

```
public class MainActivity : ActionBarActivity, ActionBar.ITabListener, ViewPager.IOnPageChangeListener
{
    public void OnPageScrollStateChanged (int state)
    {
    }

    public void OnPageScrolled (int position, float positionOffset, int positionOffsetPixels)
    {
    }

    public void OnPageSelected (int position)
    {
        ActionBar.SetSelectedNavigationItem (position);
    }
}
```

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Update the Tab Listeners

```
public void OnTabSelected (ActionBar.Tab tab, FragmentTransaction ft)
{
    viewPager.SetCurrentItem (tab.Position, true);
}
```

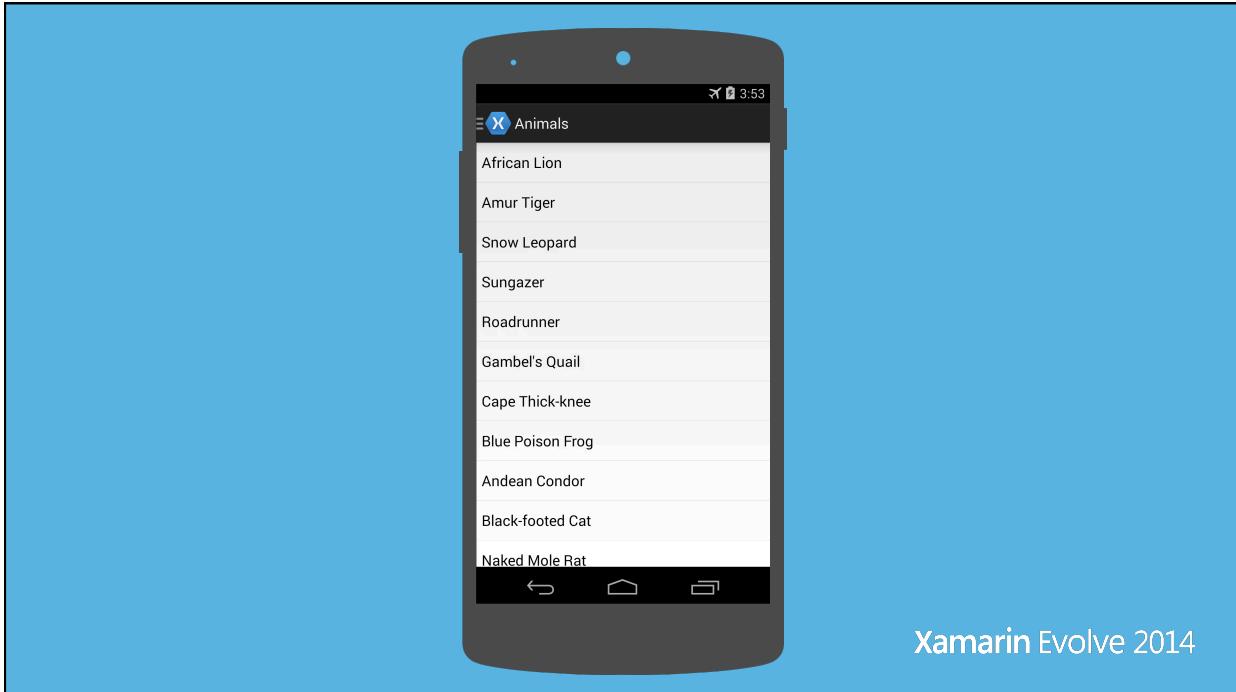
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Navigation Drawer

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Demo

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Navigation Drawer

- Fast, non-intrusive navigation between main application pages
- Intended for 3+ main pages
- Can be used for navigation and for contextual menus



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Navigation Drawer

Required Steps

- Update our application's layout to support a navigation drawer
- Configure the navigation drawer in our activity
- Synchronize our Navigation Drawer
- Respond to drawer selections

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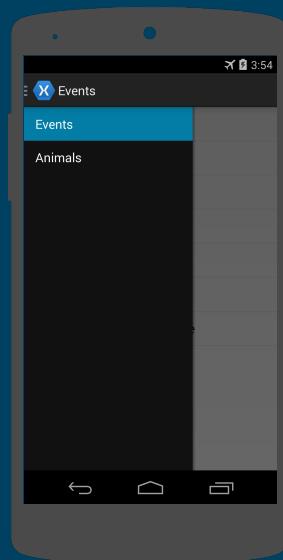
Layout Setup

```
<?xml version="1.0" encoding="utf-8"?>
<android.support.v4.widget.DrawerLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:local="http://schemas.android.com/apk/res-auto"
    android:id="@+id/drawer_layout"
    android:layout_width="match_parent"
    android:layout_height="match_parent">

    <FrameLayout
        android:id="@+id/content_frame"
        android:layout_width="match_parent"
        android:layout_height="match_parent" />

    <ListView
        android:id="@+id/flyout"
        android:divider="@android:color/transparent"
        android:dividerHeight="0dp"
        android:choiceMode="singleChoice"
        android:layout_width="240dp"
        android:layout_height="match_parent"
        android:layout_gravity="start"
        android:background="#111" />

</android.support.v4.widget.DrawerLayout>
```



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Layout Setup

```
<?xml version="1.0" encoding="utf-8"?>
<android.support.v4.widget.DrawerLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:local="http://schemas.android.com/apk/res-auto"
    android:id="@+id/drawer_layout"
    android:layout_width="match_parent"
    android:layout_height="match_parent">

    <FrameLayout
        android:id="@+id/content_frame"
        android:layout_width="match_parent"
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</android.support.v4.widget.DrawerLayout>
```



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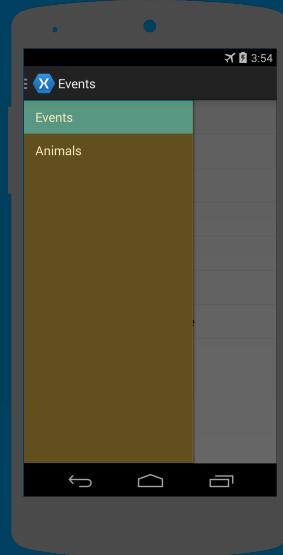
Layout Setup

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<?xml version="1.0" encoding="utf-8"?>
<android.support.v4.widget.DrawerLayout
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    xmlns:local="http://schemas.android.com/apk/res-auto"
    android:id="@+id/drawer_layout"
    android:layout_width="match_parent"
    android:layout_height="match_parent">

    <FrameLayout
        android:id="@+id/content_frame"
        android:layout_width="match_parent"
        android:layout_height="match_parent" />

    <ListView
        android:id="@+id/flyout"
        android:divider="@android:color/transparent"
        android:dividerHeight="0dp"
        android:choiceMode="singleChoice"
        android:layout_width="240dp"
        android:layout_height="match_parent"
        android:layout_gravity="start"
        android:background="#111" />

</android.support.v4.widget.DrawerLayout>
```



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Drawer Setup

```
public class MainActivity : ActionBarActivity, IFragmentNavigation
{
    DrawerLayout drawerLayout;
    ActionBarDrawerToggle drawerToggle;

    protected override void OnCreate (Bundle bundle)
    {
        base.OnCreate (bundle);
        SetContentView (Resource.Layout.Main);

        drawerLayout = FindViewById<DrawerLayout> (Resource.Id.drawer_layout);

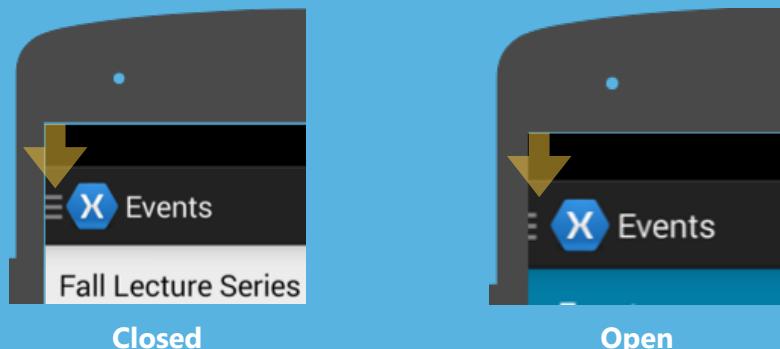
        drawerToggle = new ActionBarDrawerToggle (this,
            drawerLayout, Resource.Drawable.ic_drawer,
            Resource.String.drawer_open, Resource.String.drawer_close);

        drawerLayout.SetDrawerShadow (Resource.Drawable.drawer_shadow, (int)GravityFlags.Start);

        drawerLayout.SetDrawerListener (drawerToggle);
    }
}
```

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Navigation Drawer



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Drawer Setup

```
protected override void OnCreate (Bundle bundle)
{
    base.OnCreate (bundle);
    SetContentView (Resource.Layout.Main);

    drawerToggle = new ActionBarDrawerToggle (this,
        drawerLayout, Resource.Drawable.ic_drawer,
        Resource.String.drawer_open, Resource.String.drawer_close);

    drawerLayout = FindViewById<DrawerLayout> (Resource.Id.drawer_layout);
    drawerLayout.SetDrawerShadow (Resource.Drawable.drawer_shadow, (int)GravityFlags.Start);
    drawerList = FindViewById<ListView> (Resource.Id.flyout);
    drawerList.Adapter = new ArrayAdapter<string> (this, Resource.Layout.drawer_list_item, sections);

    drawerLayout.SetDrawerListener (drawerToggle);
}
```

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Closed

Open

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Drawer Setup

```
protected override void OnCreate (Bundle bundle)
{
    base.OnCreate (bundle);
    SetContentView (Resource.Layout.Main);

    drawerToggle = new ActionBarDrawerToggle (this,
        drawerLayout, Resource.Drawable.ic_drawer,
        Resource.String.drawer_open, Resource.String.drawer_close);

    drawerLayout = FindViewById<DrawerLayout> (Resource.Id.drawer_layout);
    drawerLayout.SetDrawerShadow (Resource.Drawable.drawer_shadow, (int)GravityFlags.Start);
    drawerList = FindViewById<ListView> (Resource.Id.flyout);
    drawerList.Adapter = new ArrayAdapter<string> (this, Resource.Layout.drawer_list_item, sections);

    drawerLayout.SetDrawerListener (drawerToggle);
```

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Make sure the Action Bar is Enabled

```
drawerToggle = new ActionBarDrawerToggle (this,
    drawerLayout, Resource.Drawable.ic_drawer,
    Resource.String.drawer_open, Resource.String.drawer_close);

drawerLayout.SetDrawerListener (drawerToggle);

drawerList.ItemClick += (object sender, AdapterView.ItemClickEventArgs e) => ListItemClicked (e.Position);
ListItemClicked (0);

ActionBar.SetDisplayHomeAsUpEnabled (true);
ActionBar.SetHomeButtonEnabled (true);
}
```

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Responding to Selections

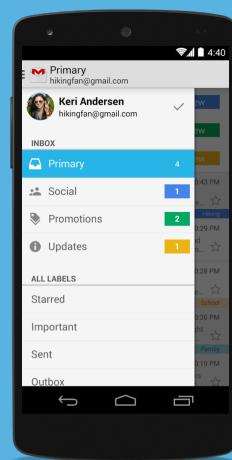
```
public override bool OnOptionsItemSelected (IMenuItem item)
{
    if(drawerToggle.DrawerIndicatorEnabled && drawerToggle.OnOptionsItemSelected(item))
        return true;

    return base.OnOptionsItemSelected (item);
}
```

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Quick Tips

- On first run, consider starting your app with the Navigation Drawer displayed
- Make your drawer listings descriptive
 - Icons
 - Images
 - Counters
- The Android Developer Center has Navigation Drawer Icons



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Common Android Navigation Patterns



Stack Navigation



Tab Navigation



Navigation Drawer

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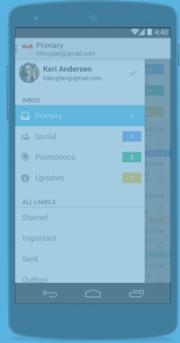
Common Android Navigation Patterns



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Navigation Drawer

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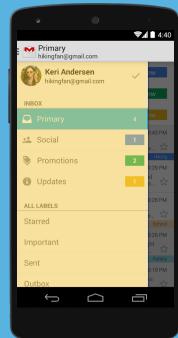
Common Android Navigation Patterns



Stack Navigation



Tab Navigation



Navigation Drawer

Xamarin Evolve 2014

// Questions? //

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Homeward Bound: Implementing Android Navigation Patterns

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