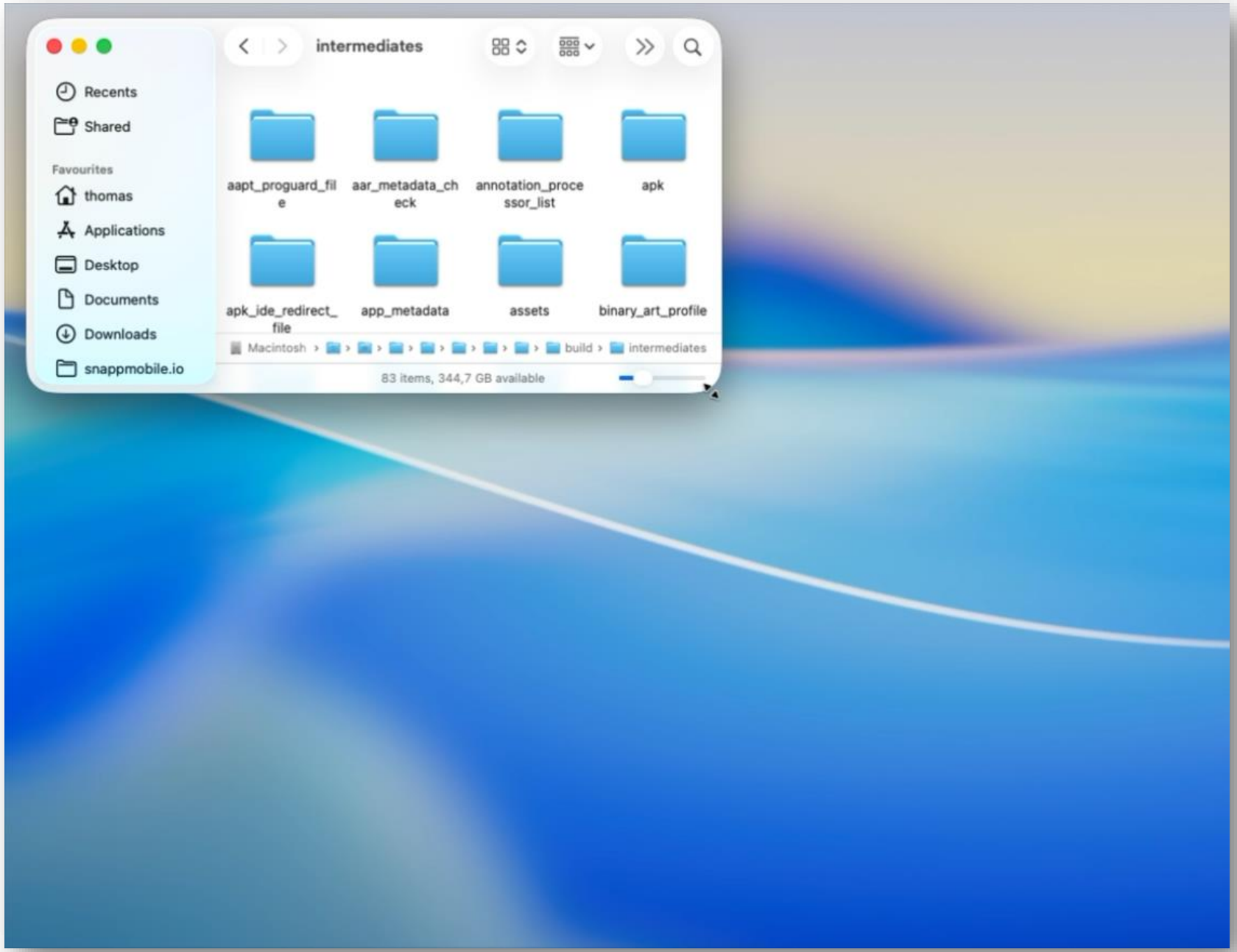
Building Responsive User Interfaces with Compose Multiplatform

Thomas Künneth

Experts



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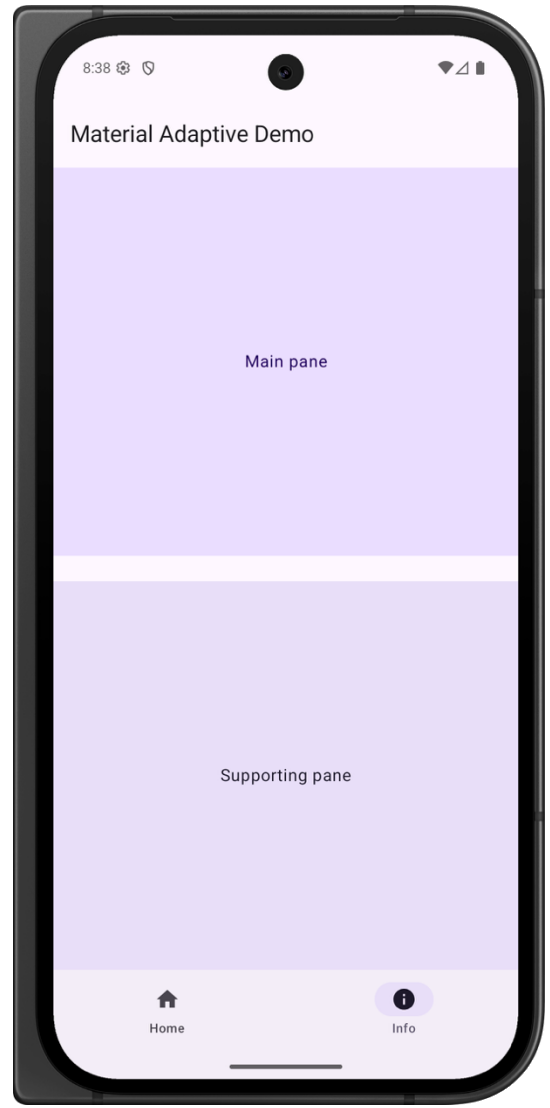

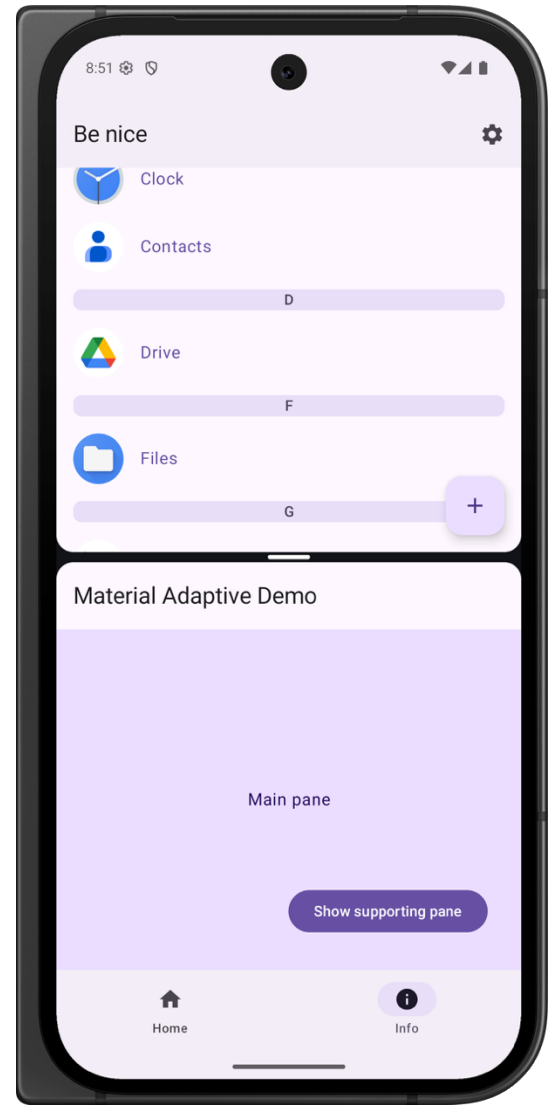

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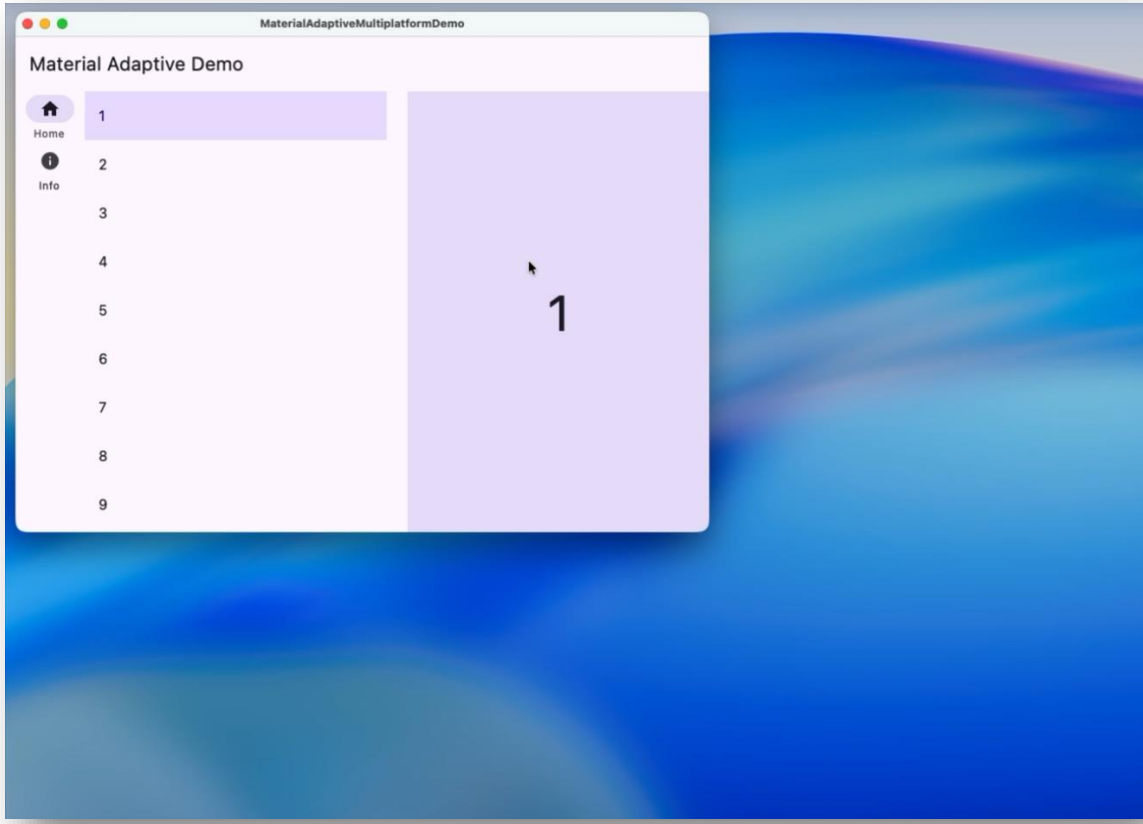
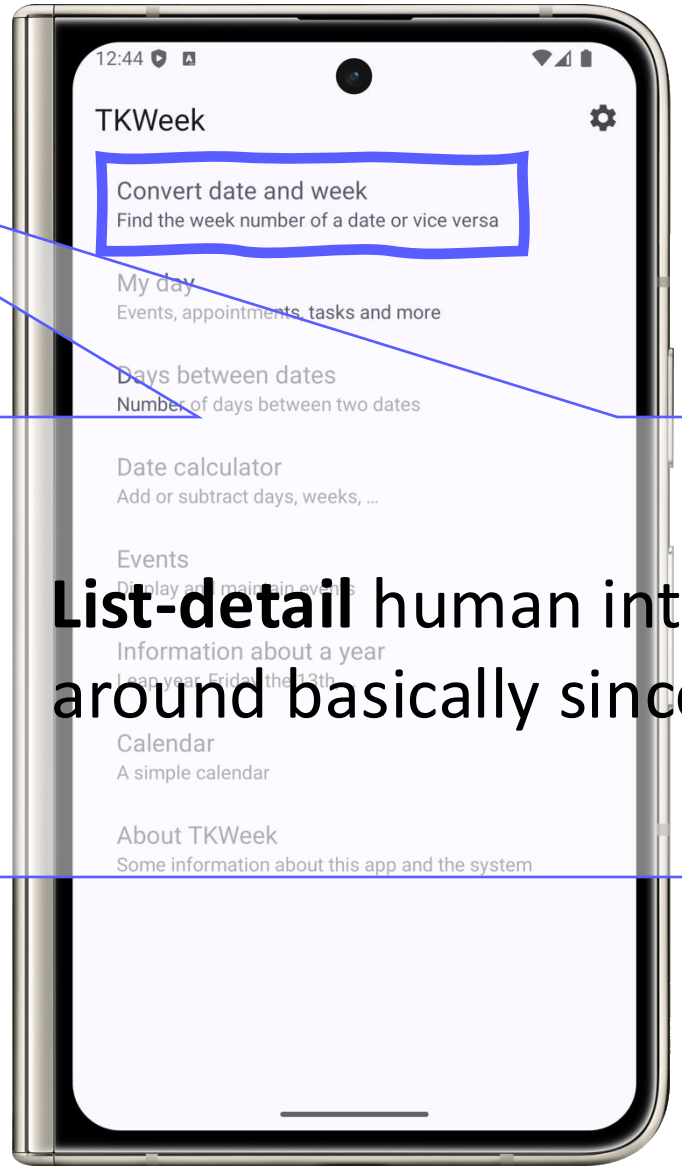
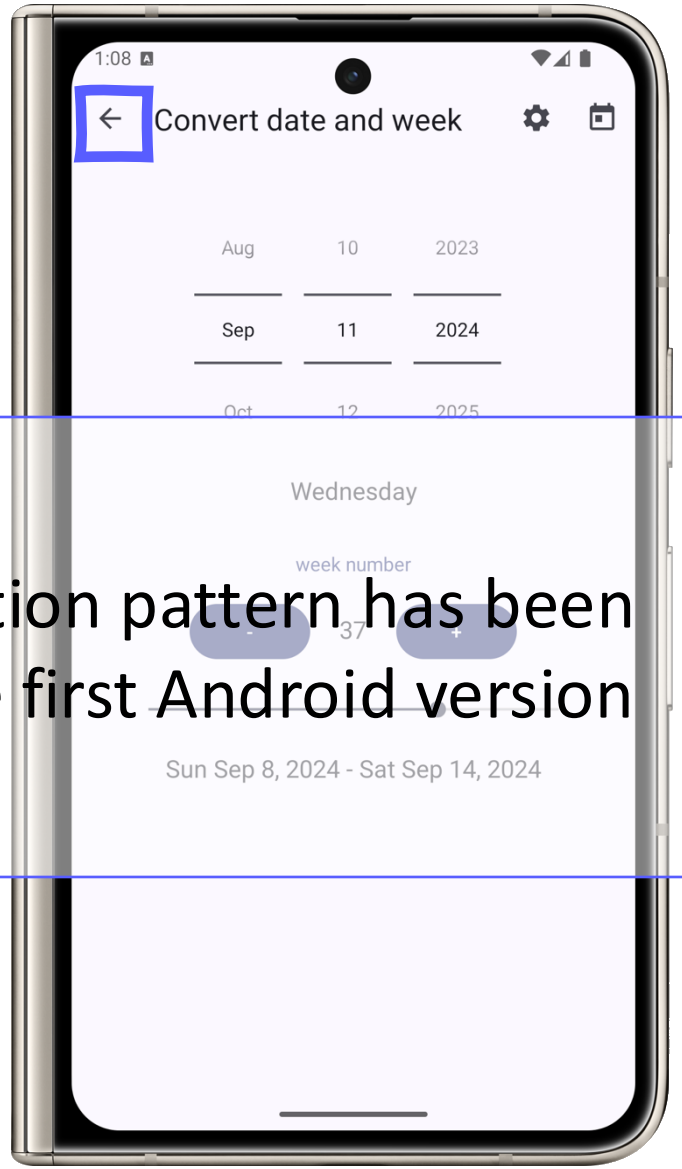
Compose Multiplatform

- Cross-platform framework for building native apps for Android, iOS, the Desktop, and the Web
- Uses Kotlin for business logic and UI
- UI is built using Jetpack Compose



Since Compose Multiplatform uses Jetpack Compose, let’s take a look how modern Android apps tackle different **screen sizes** and **form factors**





List-detail human interaction pattern has been around basically since the first Android version

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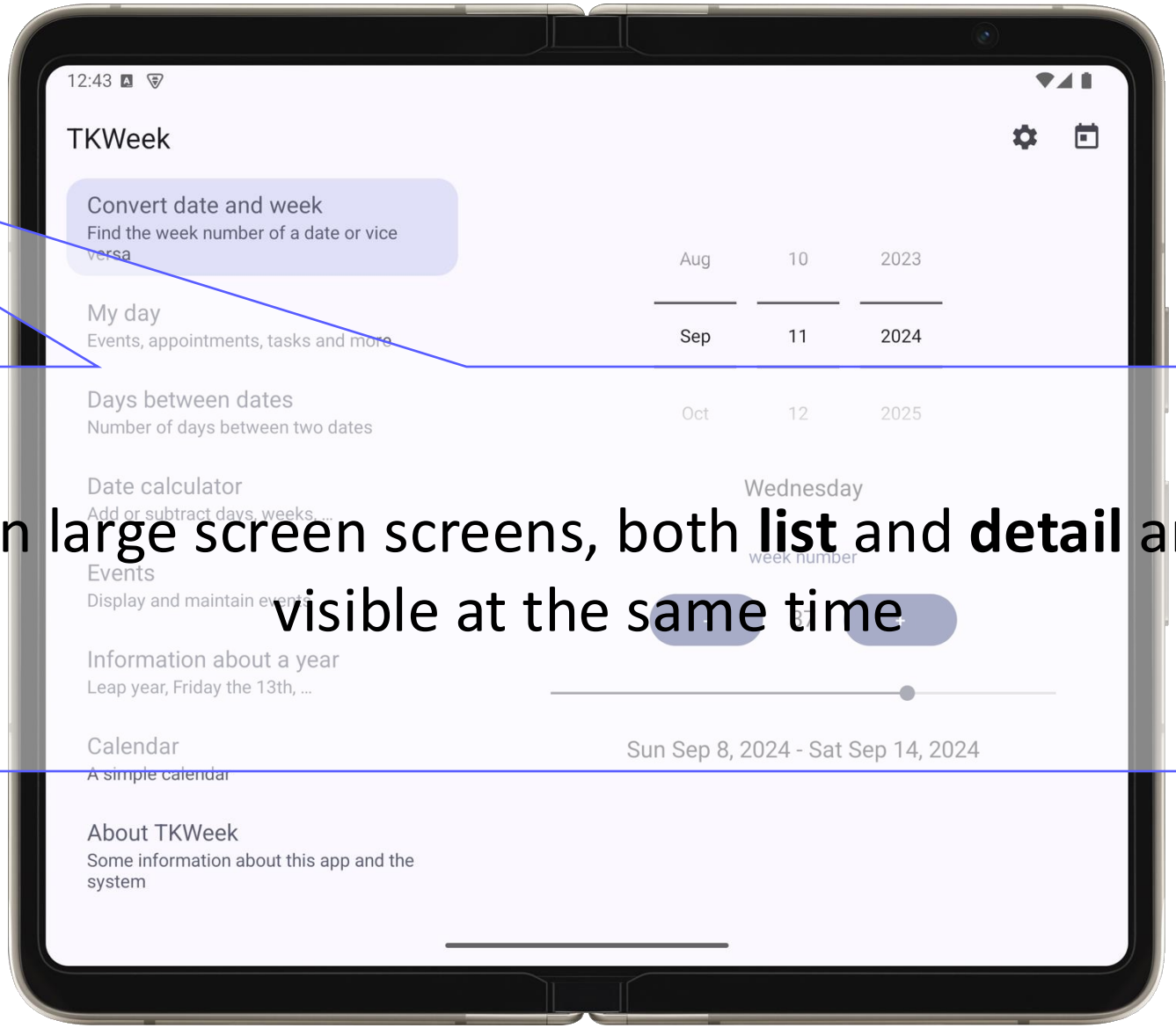

On large screen screens, both **list** and **detail** are visible at the same time

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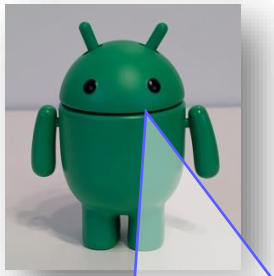
Granted, that’s pretty much how we do it basically everywhere

Just took Google some time to formalize and provide architectural blueprints and library support

Material 3

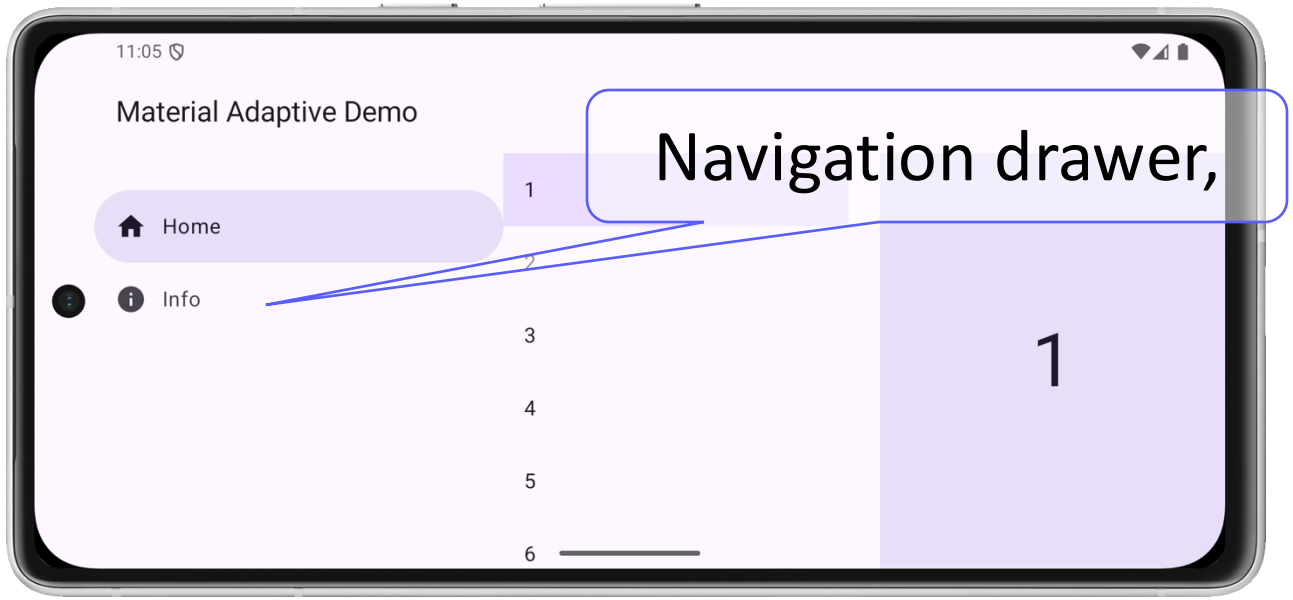
- Google’s design system and design language on Android
- Used in many Google Web Apps and Flutter
- Also available in Compose Multiplatform

- Defines components and their behaviour
- Specifies visual appearance like fonts, colours, paddings, margins and gaps
- Defines layout, including composition of element hierarchies
- Provides navigation

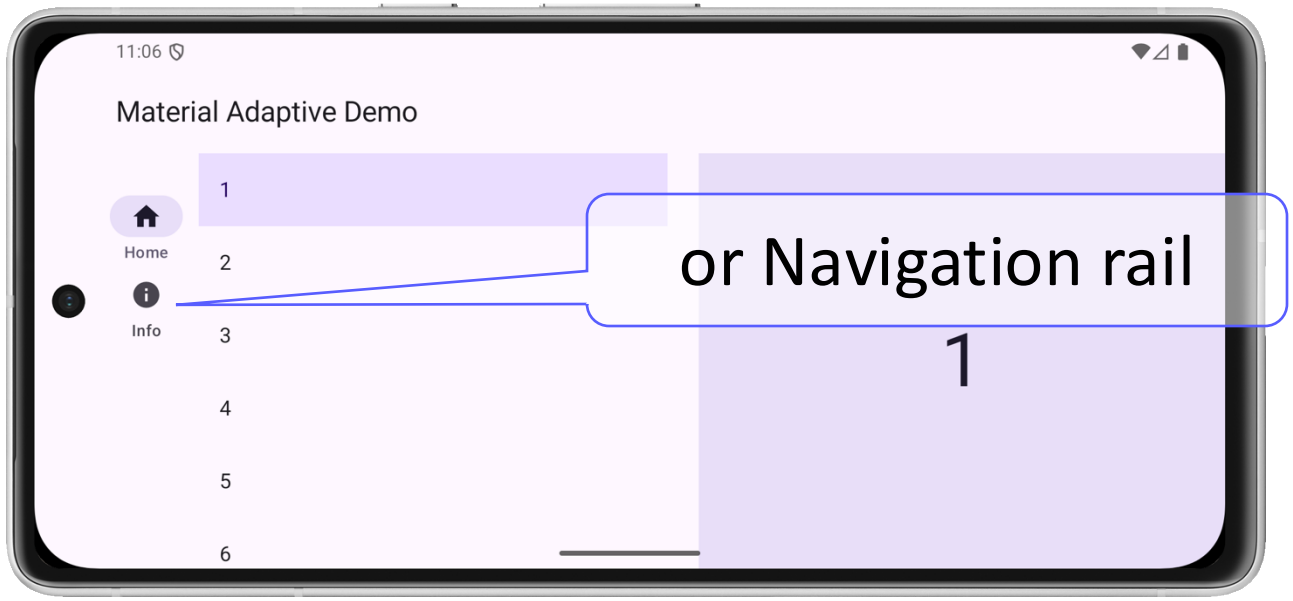


Top-level navigation is done using either …

Navigation bar,



Navigation drawer,



or Navigation rail

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But when to use which

?

Material3 Adaptive

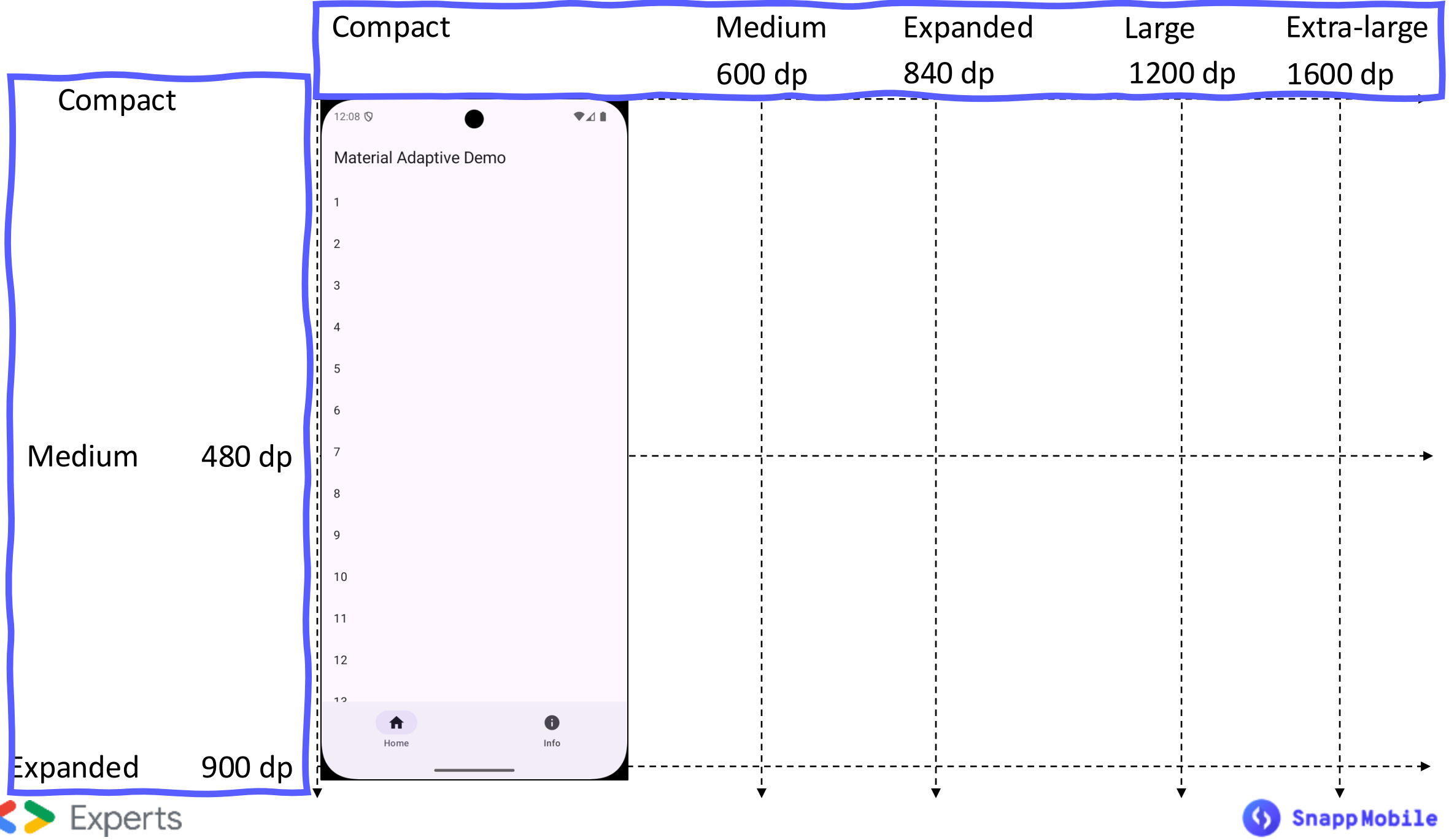
- Builds upon **canonical layouts** to create consistent, responsive user interfaces
- **Selects** the best **navigation component** for the available space
- **Provides pre-built scaffolds** to simplify implementation

Canonical layouts

- Template for a specific type of layout or design
- Based on **logical panes**
- Implementations use **Window Size Classes** to determine …
  - which panes are visible
  - size, location, and content of panes

Window size classes

- A set of opinionated layout breakpoints
- Classify available width and height separately
- Define categories: **Compact**, **Medium**, **Expanded**, **Large**, and **Extra-large**
- Affect the location and size of both **navigation and content area**, as well as which components are used



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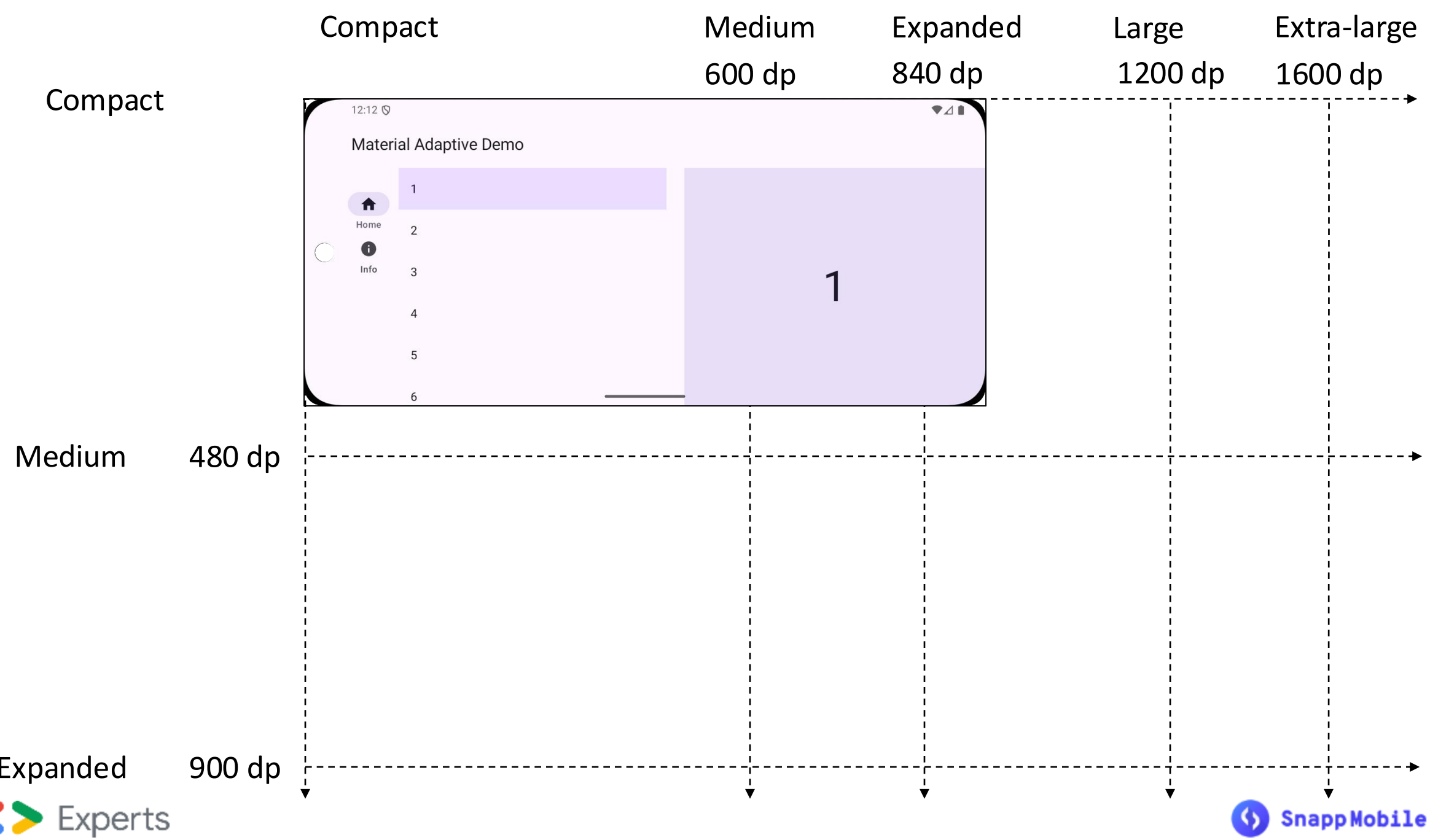

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Canonical layouts

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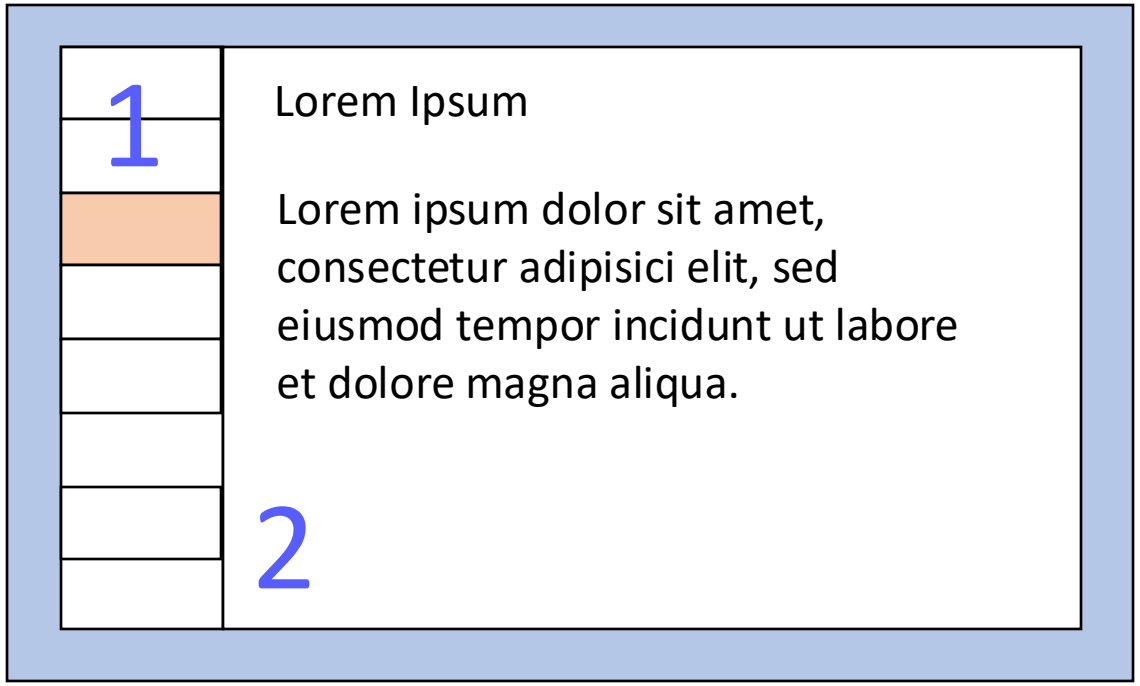
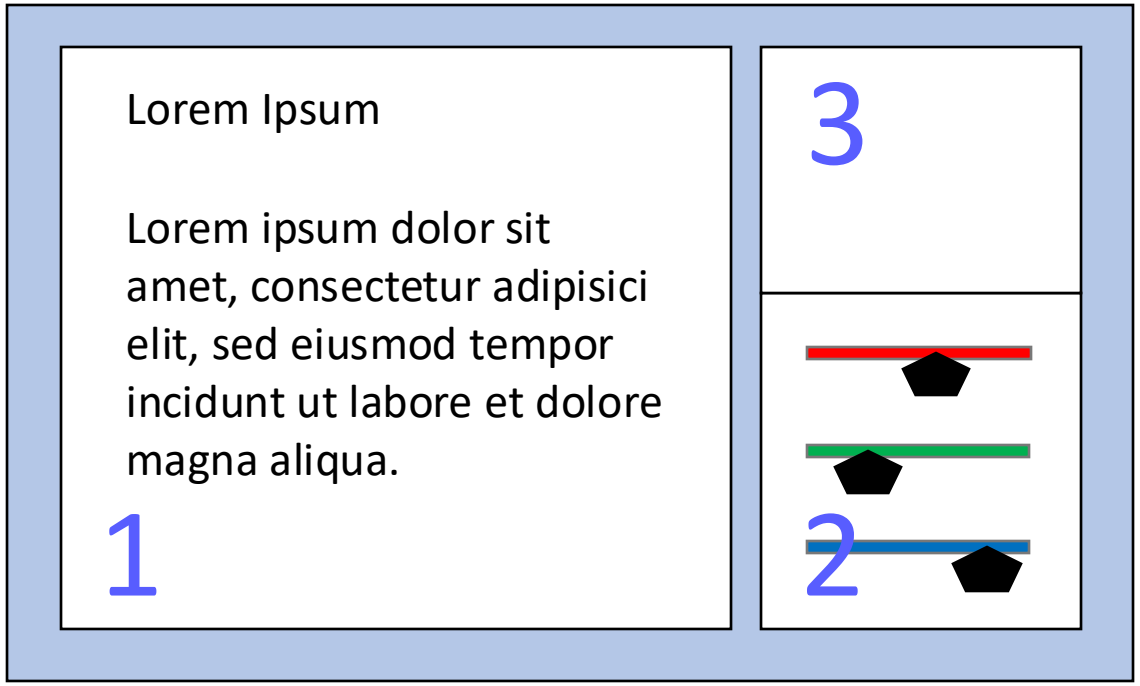
List-detail

- Scrollable lists of items
- Item detail containing supplementary information
- Two logical panes



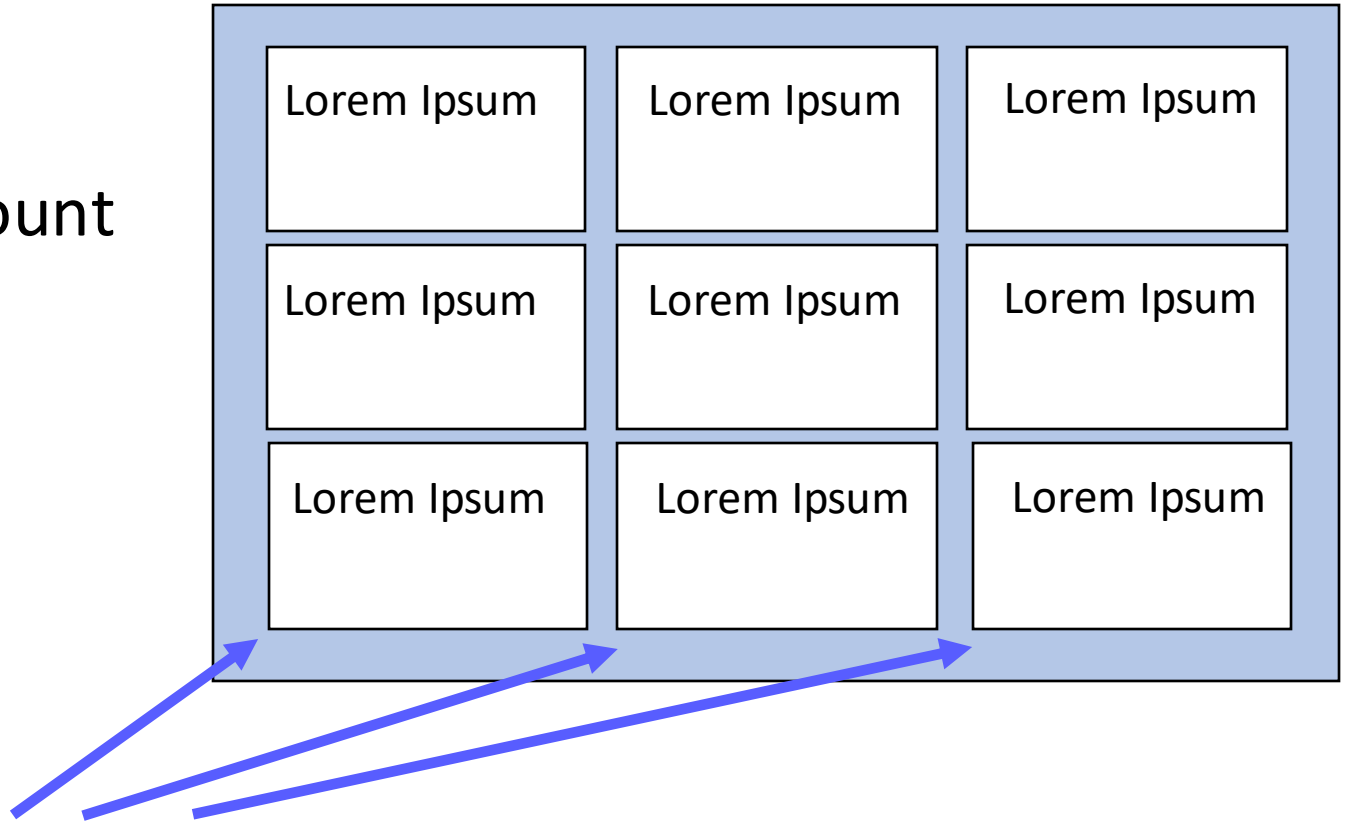
Supporting pane

- Primary section for the main app content
- Secondary section supports the main app content
- Optional tertiary section for additional content



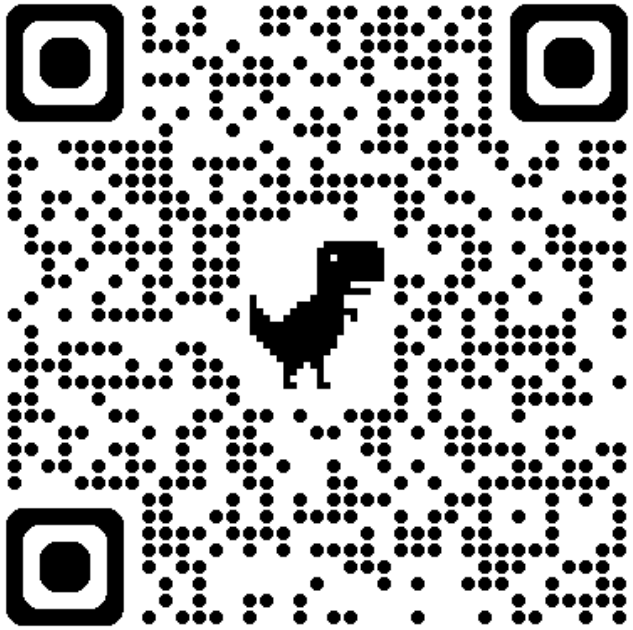
Feed

- Organizes cards in a grid
- Easily browse a large amount of content



These are no panes

- Material 3 Adaptive shows or hides panes based on Window Size classes
- Provides means to navigate between panes
- *List-detail* implemented by `ListDetailPaneScaffold` and `NavigableListDetailPaneScaffold`
- *Supporting Pane* implemented by `SupportingPaneScaffold` and `NavigableSupportingPaneScaffold`
- No implementation for *Feed*



https://github.com/tkuenneth/foldables_and_large_screens

Experts

```
package de.thomaskuenneth.material.adaptive.multiplatform

import ...

@OptIn( ...markerClass = ExperimentalMaterial3Api::class) 3 Usages
@Composable
fun MaterialAdaptiveDemo() {
    var currentDestination by rememberSaveable { mutableStateOf( val
    val adaptiveInfo = currentWindowAdaptiveInfo()
    val customNavSuiteType =
        if (adaptiveInfo.windowSizeClass.isWidthAtLeastBreakpoint( v
            NavigationSuiteType.NavigationDrawer
        } else {
            NavigationSuiteScaffoldDefaults.calculateFromAdaptiveIn
        }
    val navigationState = remember { NavigationState() }
    Scaffold(
        contentWindowInsets = WindowInsets(),
        topBar = {
            TopAppBar(
                title = { Text( text = stringResource( resource = Res.s
                navigationIcon = {
                    if (navigationState.canNavigateBack) {
                        IconButton(
                            onClick = {
                                navigationState.navigateBack()
                            }
                        ) {
                            Icon(
                                imageVector = Icons.AutoMirrored.Out
```

```kotlin
fun main() = application {
    Window(
        onCloseRequest = ::exitApplication,
        title = stringResource(Res.string.app_name),
    ) {
        MaterialAdaptiveDemo()
    }
}
```

```kotlin
class MainActivity : ComponentActivity() {
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        enableEdgeToEdge()
        setContent {
            MaterialAdaptiveDemo()
        }
    }
}
```

Sets a color scheme and invokes `MaterialAdaptiveDemoScaffold`

```kotlin
package de.thomaskuenneth.material.adaptive.multiplatform

import androidx.compose.ui.window.ComposeUIViewController

fun MainViewController() = ComposeUIViewController { MaterialAdaptiveDemo() }
```

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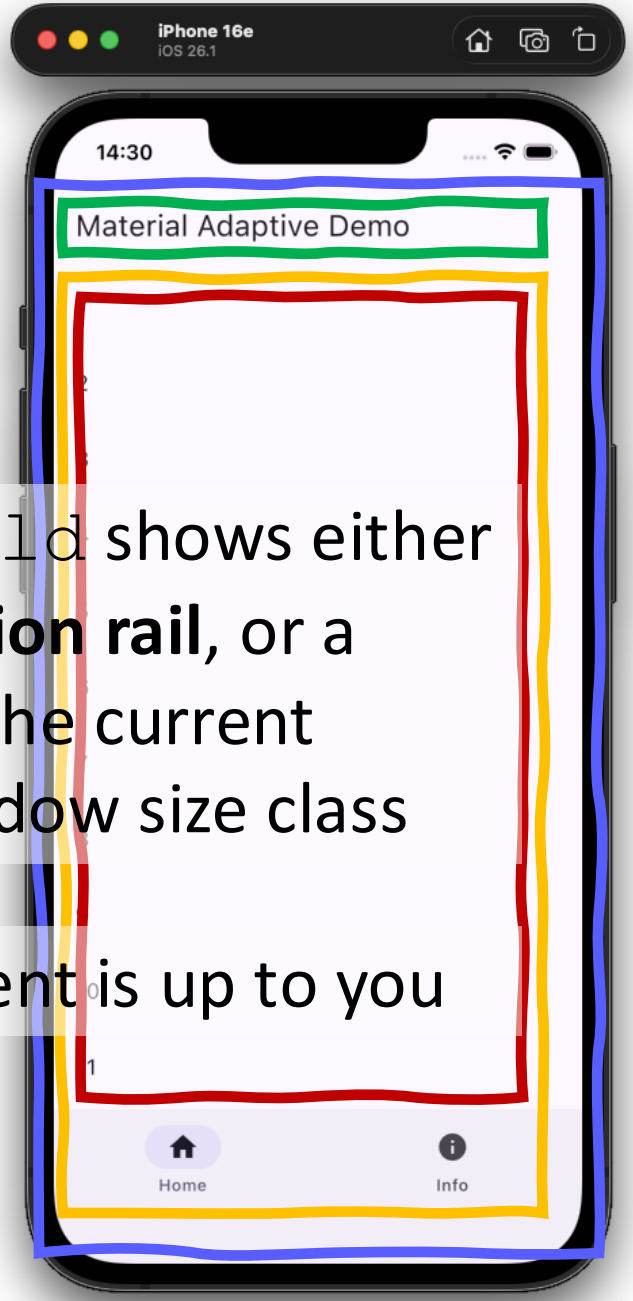
`NavigationSuiteScaffold` shows either a **navigation drawer**, a **navigation rail**, or a **navigation bar**, depending on the current horizontal and / or vertical window size class

What will be shown as its content is up to you




```kotlin
@OptIn(ExperimentalMaterial3Api::class)
@Composable
fun MaterialAdaptiveDemoScaffold() {
    var currentDestination by rememberSaveable { mutableStateOf(AppDestinations.Home) }
    val adaptiveInfo = currentWindowAdaptiveInfo()
    val customNavSuiteType =
        if (adaptiveInfo.windowSizeClass.isWidthAtLeastBreakpoint(WIDTH_DP_EXPANDED_LOWER_BOUND)) {
            NavigationSuiteType.NavigationDrawer
        } else {
            NavigationSuiteScaffoldDefaults.calculateFromAdaptiveInfo(adaptiveInfo)
        }
    val navigationState = remember { NavigationState() }
    Scaffold(
        contentWindowInsets = WindowInsets(),
        topBar = {
            TopAppBar(
                title = { Text(stringResource(Res.string.app_name)) },
                navigationIcon = {
                    if (navigationState.canNavigateBack) {
                        IconButton(
                            onClick = {
                                navigationState.navigateBack()
                            }
                        ) {
                            Icon(
                                Icons.AutoMirrored.Outlined.ArrowBack,
                                contentDescription = stringResource(Res.string.back)
                            )
                        }
                    }
                }
            )
        }) { paddingValues ->
        NavigationSuiteScaffold(
            modifier = Modifier.padding(paddingValues),
            layoutType = customNavSuiteType,
            navigationSuiteItems = {
                AppDestinations.entries.forEach {
                    item(
                        selected = it == currentDestination,
                        onClick = { currentDestination = it },
                        icon = {
                            Icon(
                                imageVector = it.icon,
                                contentDescription = stringResource(it.contentDescription)
                            )
                        },
                        label = {
                            Text(
                                text = stringResource(it.labelRes)
                            )
                        },
                    )
                }
            }) {
            when (currentDestination) {
                AppDestinations.Home -> {
                    HomePane(navigationState)
                }

                AppDestinations.Info -> {
                    InfoPane(navigationState)
                }
            }
        }
    }
}
```

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are passed to `NavigationSuiteScaffold`

```kotlin
enum class AppDestinations(
    val labelRes: StringResource,
    val icon: ImageVector,
    val contentDescription: StringResource = labelRes,
) {
    Home(
        Res.string.tab_home,
        Icons.Default.Home
    ),
    Info(
        Res.string.tab_info,
        Icons.Default.Info
    ),
}
```

Two top-level destinations

```kotlin
NavigationSuiteScaffold(
    modifier = Modifier.padding(paddingValues),
    layoutType = customNavSuiteType,
    navigationSuiteItems = {
        AppDestinations.entries.forEach {
            item(
                selected = it == currentDestination,
                onClick = { currentDestination = it },
                icon = {
                    Icon(
                        imageVector = it.icon,
                        contentDescription = stringResource(it.contentDescription)
                    )
                },
                label = {
                    Text(
                        text = stringResource(it.labelRes)
                    )
                },
            )
        }
    }
) {
    when (currentDestination) {
        AppDestinations.Home -> {
            HomePane(navigationState)
        }

        AppDestinations.Info -> {
            InfoPane(navigationState)
        }
    }
}
```

```kotlin
var currentDestination by rememberSaveable { mutableStateOf( value = AppDestinations.Home) }
```

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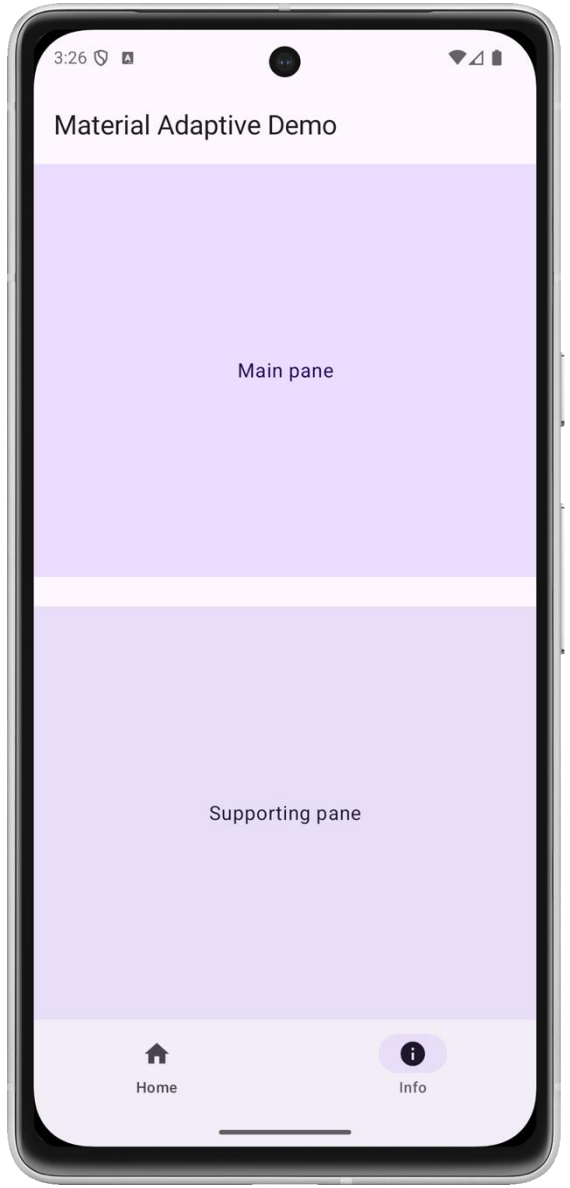

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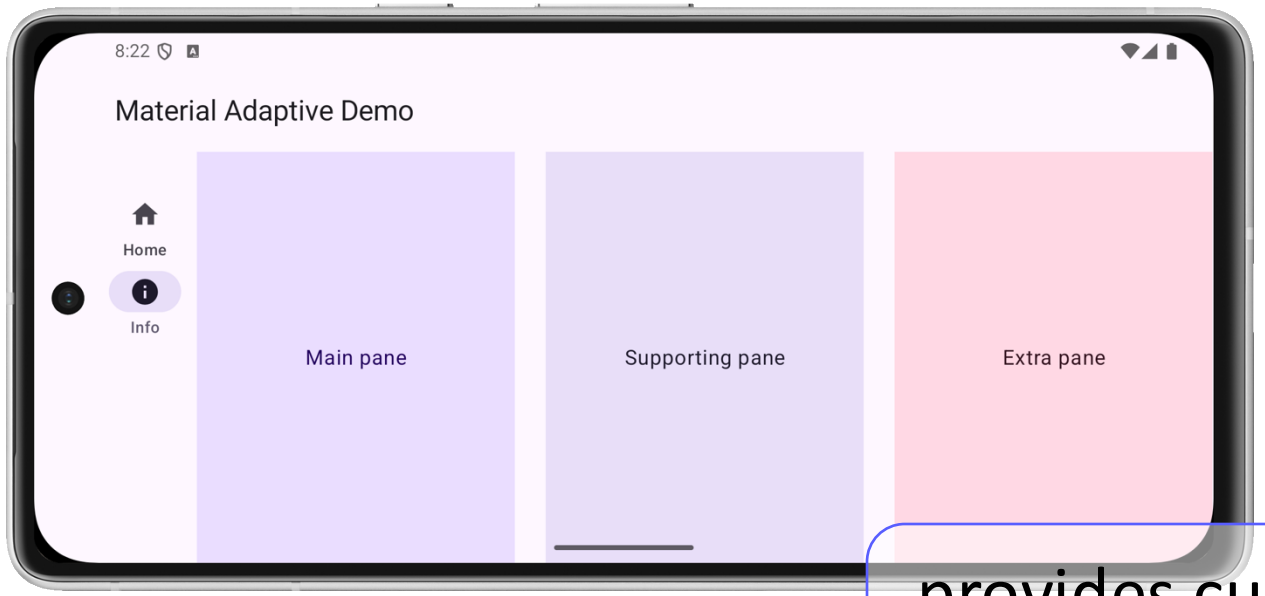
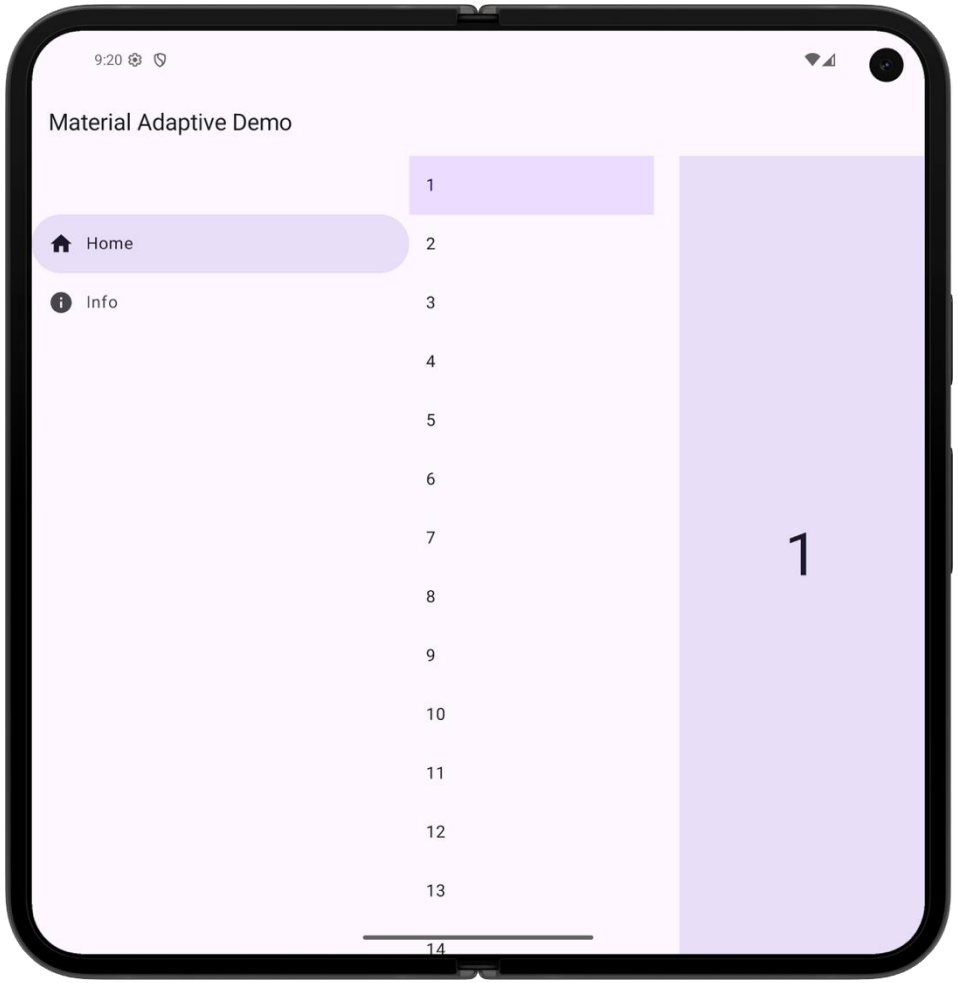



```
1  val adaptiveInfo = currentWindowAdaptiveInfo()
2  val customNavSuiteType =
3      if (adaptiveInfo.windowSizeClass.isWidthAtLeastBreakpoint(WIDTH_DP_EXPANDED_LOWER_BOUND)) {
4          NavigationSuiteType.NavigationRail
5      } else {
6          NavigationSuiteScaffoldDefaults.calculateFromAdaptiveInfo(adaptiveInfo)
7      }
8  Scaffold(…) { paddingValues ->
9      NavigationSuiteScaffold(
10         modifier = Modifier.padding(paddingValues),
11         layoutType = customNavSuiteType,
12         navigationSuiteItems = {
13             …
```

provides current Window Size Class and device posture

Use a custom one or go with the default?



Home pane: list and detail of current item

```kotlin
@Composable
fun HomePane(navigationState: NavigationState) {
    val coroutineScope = rememberCoroutineScope()
    val navigator = rememberListDetailPaneScaffoldNavigator<Int>(
        scaffoldDirective = calculatePaneScaffoldDirectiveWithTwoPanesOnMediumWidth(
            currentWindowAdaptiveInfo()
        ))
    var currentIndex by rememberSaveable { mutableIntStateOf(-1) }
    val onItemClicked: (Int) -> Unit = { id ->
        currentIndex = id
        coroutineScope.launch { navigator.navigateTo(
                pane = ListDetailPaneScaffoldRole.Detail, contentKey = id
            )}}
    val detailVisible =
        navigator.scaffoldValue[ListDetailPaneScaffoldRole.Detail] == PaneAdaptedValue.Expanded
    if (detailVisible && currentIndex == -1) currentIndex = 0
    NavigationHelper(navigator = navigator,
        navigationState = navigationState,
        coroutineScope = coroutineScope)
    ListDetailPaneScaffold(
        directive = navigator.scaffoldDirective,
        value = navigator.scaffoldValue,
        listPane = { MyList(
                onItemClicked = onItemClicked,
                currentIndex = currentIndex,
                detailVisible = detailVisible
            )},
        detailPane = { MyListDetail(
                currentIndex = currentIndex,
                listHidden = navigator.scaffoldValue[ListDetailPaneScaffoldRole.List] == PaneAdaptedValue.Hidden)})
}
```

```kotlin
@Composable
fun HomePane(navigationState: NavigationState) {
    val coroutineScope = rememberCoroutineScope()
    val navigator = rememberListDetailPaneScaffoldNavigator<Int>(
        scaffoldDirective = calculatePaneScaffoldDirectiveWithTwoPanesOnMediumWidth(
            currentWindowAdaptiveInfo()
        ))
    var currentIndex by rememberSaveable { mutableIntStateOf(-1) }
    val onItemClicked: (Int) -> Unit = { id ->
        currentIndex = id
        coroutineScope.launch { navigator.navigateTo(
                pane = ListDetailPaneScaffoldRole.Detail, contentKey = id
            )}}
    val detailVisible =
        navigator.scaffoldValue[ListDetailPaneScaffoldRole.Detail] == PaneAdaptedValue.Expanded
    if (detailVisible && currentIndex == -1) currentIndex = 0
    NavigationHelper(navigator = navigator,
        navigationState = navigationState,
        coroutineScope = coroutineScope)
    ListDetailPaneScaffold(
        directive = navigator.scaffoldDirective,
        value = navigator.scaffoldValue,
        listPane = { MyList(
                onItemClicked = onItemClicked,
                currentIndex = currentIndex,
                detailVisible = detailVisible
            )},
        detailPane = { MyListDetail(
                currentIndex = currentIndex,
                listHidden = navigator.scaffoldValue[ListDetailPaneScaffoldRole.List] == PaneAdaptedValue.Hidden)})
}
```

Defines how the scaffold should arrange its panes

Indicates how each pane of the scaffold is adapted

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```kotlin
@Composable
fun ListDetailPaneScaffold(
    directive: PaneScaffoldDirective,
    value: ThreePaneScaffoldValue,
    listPane: @Composable ThreePaneScaffoldPaneScope.() -> Unit,
    detailPane: @Composable ThreePaneScaffoldPaneScope.() -> Unit,
    modifier: Modifier = Modifier,
    extraPane: (@Composable ThreePaneScaffoldPaneScope.() -> Unit)? = null,
    paneExpansionDragHandle: (@Composable ThreePaneScaffoldScope.(PaneExpansionState) -> Unit)? =
        null,
    paneExpansionState: PaneExpansionState? = null,
) {
    val expansionState =
        paneExpansionState
            ?: rememberDefaultPaneExpansionState(
                keyProvider = { value },
                mutable = paneExpansionDragHandle != null,
            )
    ThreePaneScaffold(
        modifier = modifier.fillMaxSize(),
        scaffoldDirective = directive,
        scaffoldValue = value,
        paneOrder = ListDetailPaneScaffoldDefaults.PaneOrder,
        secondaryPane = listPane,
        tertiaryPane = extraPane,
        paneExpansionDragHandle = paneExpansionDragHandle,
        paneExpansionState = expansionState,
        primaryPane = detailPane,
    )
}
```

`primary` - `PaneAdaptedValue` of the primary pane of `ThreePaneScaffold`
`secondary` - `PaneAdaptedValue` of the secondary pane of `ThreePaneScaffold`
`tertiary` - `PaneAdaptedValue` of the tertiary pane of `ThreePaneScaffold`

Contains the adapted values of each pane

```kotlin
/**
 * Denotes that the associated pane should be displayed in its full width and height.
 */
val Expanded = PaneAdaptedValue( description: "Expanded")

/**
 * Denotes that the associated pane should be hidden.
 */
val Hidden = PaneAdaptedValue( description: "Hidden")
```

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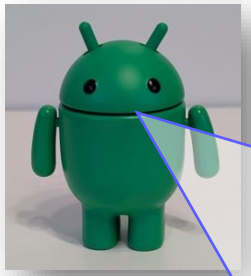


Let’s recap:

`directive` defines how the scaffold should arrange its panes

`value` indicates how each pane of the scaffold is adapted

We obtained the values from `navigator`: `navigator.scaffoldDirective` and `navigator.scaffoldValue`

So, `ThreePaneScaffoldNavigator` does all the work for us

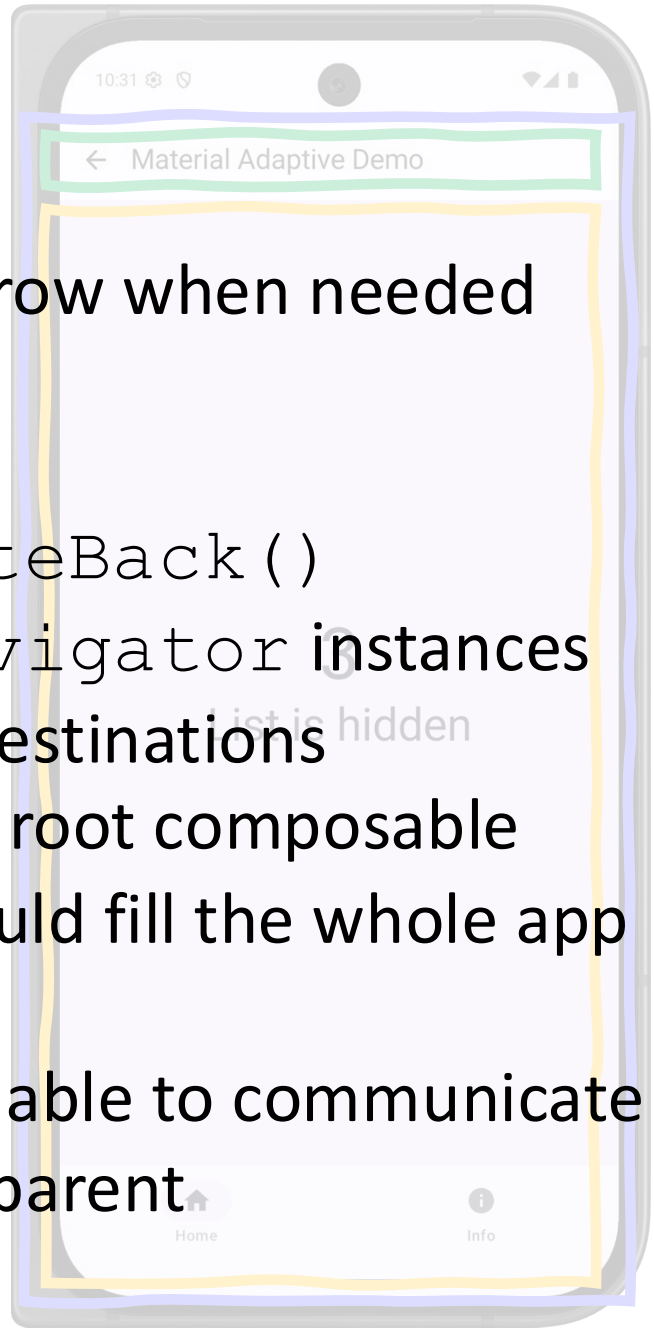
```kotlin
@Composable
fun <T> NavigationHelper(
    navigator: ThreePaneScaffoldNavigator<T>,
    navigationState: NavigationState,
    coroutineScope: CoroutineScope
) {
    LaunchedEffect(navigator.canNavigateBack()) {
        navigationState.update(
            canNavigateBack =
                navigator.canNavigateBack(),
            navigateBack = {
                coroutineScope.launch {
                    navigator.navigateBack()
                }
            }
        )
    }
    DisposableEffect(Unit) {
        onDispose {
            navigationState.clear()
        }
    }
    BackHandler(navigator.canNavigateBack()) {
        coroutineScope.launch {
            navigator.navigateBack()
        }
    }
}
```

```kotlin
class NavigationState {
    var canNavigateBack by mutableStateOf(false)
        private set

    var navigateBack: () -> Unit by mutableStateOf({})
        private set

    fun update(canNavigateBack: Boolean, navigateBack: () -> Unit) {
        this.canNavigateBack = canNavigateBack
        this.navigateBack = navigateBack
    }

    fun clear() {
        this.canNavigateBack = false
        this.navigateBack = {}
    }
}
```

That doesn’t look too complicated

But why do we need it at all?

- Top app bar shows a *Back* arrow when needed (pane-base navigation)
- We would use `navigator.canNavigateBack()`
- `ThreePaneScaffoldNavigator` instances are private to the top-level destinations
- But `Scaffold` must be the root composable because the top app bar should fill the whole app window width
- Therefore, children must be able to communicate their navigation state to the parent




```
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@Composable
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    val adaptiveInfo = currentWindowAdaptiveInfo()
    val customNavSuiteType =
        if (adaptiveInfo.windowSizeClass.isWidthAtLeastBreakpoint(WIDTH_DP_EXPANDED_LOWER_BOUND)) {
            NavigationSuiteType.NavigationDrawer
        } else {
            NavigationSuiteScaffoldDefaults.calculateFromAdaptiveInfo(adaptiveInfo)
        }
    val navigationState = remember { NavigationState() }
    Scaffold(
        contentWindowInsets = WindowInsets(),
        topBar = {
            TopAppBar(
                title = { Text(stringResource(Res.string.app_name)) },
                navigationIcon = {
                    if (navigationState.canNavigateBack) {
                        IconButton(
                            onClick = {
                                navigationState.navigateBack()
                            }
                        ) {
                            Icon(
                                Icons.AutoMirrored.Outlined.ArrowBack,
                                contentDescription = stringResource(Res.string.back)
                            )
                        }
                    }
                }
            )
        }) { paddingValues ->
        NavigationSuiteScaffold(
            modifier = Modifier.padding(paddingValues),
            layoutType = customNavSuiteType,
            navigationSuiteItems = {
                AppDestinations.entries.forEach {
                    item(
                        selected = it == currentDestination,
                        onClick = { currentDestination = it },
                        icon = {
                            Icon(
                                imageVector = it.icon,
                                contentDescription = stringResource(it.contentDescription)
                            )
                        },
                        label = {
                            Text(
                                text = stringResource(it.labelRes)
                            )
                        },
                    )
                }
            }) {
            when (currentDestination) {
                AppDestinations.Home -> {
                    HomePane(navigationState)
                }

                AppDestinations.Info -> {
                    InfoPane(navigationState)
                }
            }
        }
    }
}
```
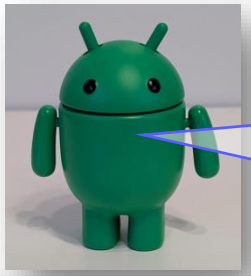

```kotlin
@Composable
fun ThreePaneScaffoldPaneScope.MyList(
    onItemClicked: (Int) -> Unit, currentIndex: Int, detailVisible: Boolean
) {
    AnimatedPane {
        LazyColumn {
            items(20) {
                ListItem(
                    headlineContent = { Text("${it + 1}") },
                    modifier = Modifier.clickable { onItemClicked(it) },
                    colors = when (detailVisible) {
                        false -> ListItemDefaults.colors()
                        true -> if (currentIndex == it) {
                            ListItemDefaults.colors(
                                containerColor = MaterialTheme.colorScheme.primaryContainer,
                                headlineColor = MaterialTheme.colorScheme.onPrimaryContainer
                            )
                        } else {
                            ListItemDefaults.colors()
                        }
                    }
                )
            }
        }
    }
}
```

```kotlin
navigator.scaffoldValue[ListDetailPaneScaffoldRole.Detail] == PaneAdaptedValue.Expanded
```

SnappMobile



Let’s focus a little more on this one:

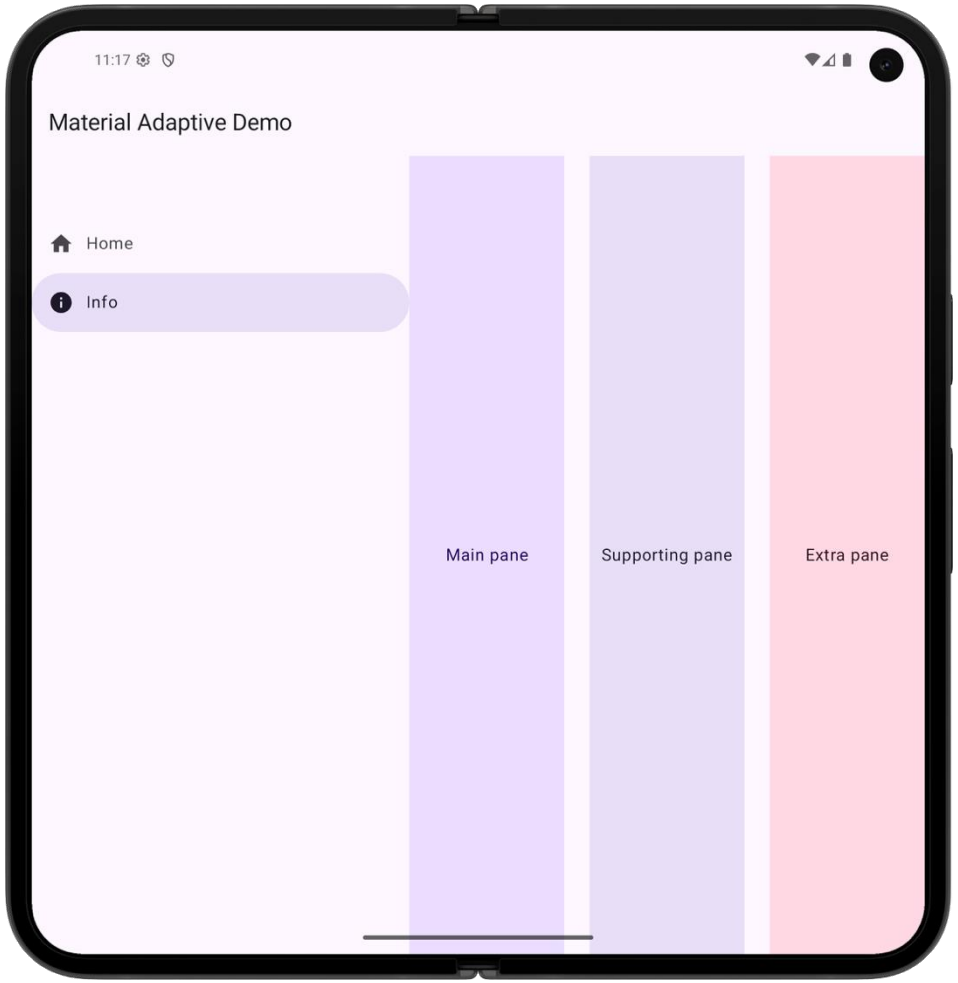
```
navigator.scaffoldValue[ListDetailPaneScaffoldRole.Detail] == PaneAdaptedValue.Expanded
```

```
object ListDetailPaneScaffoldRole {

    The list pane of ListDetailPaneScaffold, which is supposed to hold a list of item summaries
    that can be selected from, for example, the inbox mail list of a mail app. It maps to
    ThreePaneScaffoldRole.Secondary.

    val List = ThreePaneScaffoldRole.Secondary

    The detail pane of ListDetailPaneScaffold, which is supposed to hold the detailed info of a
    selected item, for example, the mail content currently being viewed. It maps to
    ThreePaneScaffoldRole.Primary.

    val Detail = ThreePaneScaffoldRole.Primary

    The extra pane of ListDetailPaneScaffold, which is supposed to
    besides the list and the detail panes, for example, a task list or a m
    It maps to ThreePaneScaffoldRole.Tertiary.

    val Extra = ThreePaneScaffoldRole.Tertiary
}
```

```
    Denotes that the associated pane should be displayed in its full width and height.

val Expanded = PaneAdaptedValue( description: "Expanded")

    Denotes that the associated pane should be hidden.

val Hidden = PaneAdaptedValue( description: "Hidden")
```

Easily check if a pane is currently visible

```kotlin
@Composable
fun ThreePaneScaffoldPaneScope.MyListDetail(
    currentIndex: Int, listHidden: Boolean navigator.scaffoldValue[ListDetailPaneScaffoldRole.List] == PaneAdaptedValue.Hidden,
) {
    AnimatedPane {
        Column(
            horizontalAlignment = Alignment.CenterHorizontally,
            verticalArrangement = Arrangement.Center,
            modifier = Modifier.background(MaterialTheme.colorScheme.secondaryContainer)
        ) {
            Text(
                "${currentIndex + 1}",
                style = MaterialTheme.typography.displayLarge,
                color = MaterialTheme.colorScheme.onSecondaryContainer
            )
            if (listHidden) {
                Text(
                    text = stringResource(Res.string.list_hidden),
                    style = MaterialTheme.typography.displaySmall,
                    color = MaterialTheme.colorScheme.onSecondaryContainer
                )
            }
        }
    }
}
```



Example of a supporting pane

```kotlin
@Composable
fun InfoPane(navigationState: NavigationState) {
    val scope = rememberCoroutineScope()
    val navigator = rememberSupportingPaneScaffoldNavigator(
        scaffoldDirective = calculatePaneScaffoldDirective(currentWindowAdaptiveInfo()).copy(
            maxHorizontalPartitions = with(currentWindowAdaptiveInfo().windowSizeClass) {
                if (isWidthAtLeastBreakpoint(WIDTH_DP_EXPANDED_LOWER_BOUND))
                    3
                else if (isWidthAtLeastBreakpoint(WIDTH_DP_MEDIUM_LOWER_BOUND))
                    2
                else 1
            }
        )
    )
    NavigationHelper(
        navigator = navigator,
        navigationState = navigationState,
        coroutineScope = scope
    )
    SupportingPaneScaffold(
        directive = navigator.scaffoldDirective,
        mainPane = { MainPane(navigator = navigator) },
        supportingPane = { SupportingPane(navigator = navigator) },
        extraPane = { ExtraPane() },
        value = navigator.scaffoldValue
    )
}
```

```kotlin
@Composable
fun SupportingPaneScaffold(
    directive: PaneScaffoldDirective,
    value: ThreePaneScaffoldValue,
    mainPane: @Composable ThreePaneScaffoldPaneScope.() -> Unit,
    supportingPane: @Composable ThreePaneScaffoldPaneScope.() -> Unit,
    modifier: Modifier = Modifier,
    extraPane: (@Composable ThreePaneScaffoldPaneScope.() -> Unit)? = null,
    paneExpansionDragHandle: (@Composable ThreePaneScaffoldScope.(PaneExpansionState) -> Unit)? =
        null,
    paneExpansionState: PaneExpansionState? = null,
) {
    val expansionState =
        paneExpansionState
            ?: rememberDefaultPaneExpansionState(
                keyProvider = { value },
                mutable = paneExpansionDragHandle != null,
            )
    ThreePaneScaffold(
        modifier = modifier.fillMaxSize(),
        scaffoldDirective = directive,
        scaffoldValue = value,
        paneOrder = SupportingPaneScaffoldDefaults.PaneOrder,
        secondaryPane = supportingPane,
        tertiaryPane = extraPane,
        paneExpansionDragHandle = paneExpansionDragHandle,
        paneExpansionState = expansionState,
        primaryPane = mainPane,
    )
}
```

```kotlin
@Composable
fun ThreePaneScaffoldPaneScope.MainPane(navigator: ThreePaneScaffoldNavigator<Any>) {
    val scope = rememberCoroutineScope()
    ColoredBox(
        textColor = MaterialTheme.colorScheme.onPrimaryContainer,
        backgroundColor = MaterialTheme.colorScheme.primaryContainer,
        resIdMessage = Res.string.main_pane,
        resIdButton = Res.string.show_supporting_pane,
        shouldShowButton = navigator.scaffoldValue[SupportingPaneScaffoldRole.Supporting] == PaneAdaptedValue.Hidden,
        onClick = { scope.launch { navigator.navigateTo(SupportingPaneScaffoldRole.Supporting) } })
}
```

```kotlin
@Composable
fun ThreePaneScaffoldPaneScope.ColoredBox(
    textColor: Color, backgroundColor: Color, shouldShowButton: Boolean,
    resIdMessage: StringResource, resIdButton: StringResource,
    onClick: () -> Unit = {}
) {
    AnimatedPane {
        Box(modifier = Modifier.background(backgroundColor), contentAlignment = Alignment.BottomEnd) {
            Text(
                text = stringResource(resIdMessage),
                style = MaterialTheme.typography.bodyLarge,
                textAlign = TextAlign.Center,
                modifier = Modifier.align(Alignment.Center),
                color = textColor
            )
            if (shouldShowButton) {
                Button(onClick = onClick, modifier = Modifier.padding(all = 32.dp)) { Text(stringResource(resIdButton)) }
            }
        }
    }
}
```

```kotlin
@Composable
fun ThreePaneScaffoldPaneScope.SupportingPane(navigator: ThreePaneScaffoldNavigator<Any>) {
    val scope = rememberCoroutineScope()
    ColoredBox(
        textColor = MaterialTheme.colorScheme.onSecondaryContainer,
        backgroundColor = MaterialTheme.colorScheme.secondaryContainer,
        resIdMessage = Res.string.supporting_pane,
        resIdButton = Res.string.show_main_pane,
        shouldShowButton = navigator.scaffoldValue[SupportingPaneScaffoldRole.Main] == PaneAdaptedValue.Hidden,
        onClick = { scope.launch { navigator.navigateBack() } })
}
```

```kotlin
@Composable
fun ThreePaneScaffoldPaneScope.ExtraPane() {
    ColoredBox(
        textColor = MaterialTheme.colorScheme.onTertiaryContainer,
        backgroundColor = MaterialTheme.colorScheme.tertiaryContainer,
        resIdMessage = Res.string.extra_pane,
        resIdButton = Res.string.main_pane,
        shouldShowButton = false
    )
}
```

One more thing

- Material 3 Adaptive shows or hides panes based on Window Size classes
- Provides means to navigate between panes
- *List-detail* implemented by `ListDetailPaneScaffold` and `NavigableListDetailPaneScaffold`
- *Supporting Pane* implemented by `SupportingPaneScaffold` and `NavigableSupportingPaneScaffold`
- No implementation for *Feed*

```kotlin
@ExperimentalMaterial3AdaptiveApi
@Composable
fun <T> NavigableListDetailPaneScaffold(
    navigator: ThreePaneScaffoldNavigator<T>,
    listPane: @Composable ThreePaneScaffoldPaneScope.() -> Unit,
    detailPane: @Composable ThreePaneScaffoldPaneScope.() -> Unit,
    modifier: Modifier = Modifier,
    extraPane: (@Composable ThreePaneScaffoldPaneScope.() -> Unit)? = null,
    defaultBackBehavior: BackNavigationBehavior =
        BackNavigationBehavior.PopUntilScaffoldValueChange,
    paneExpansionDragHandle: (@Composable ThreePaneScaffoldScope.(PaneExpansionState) -> Unit)? =
        null,
    paneExpansionState: PaneExpansionState? = null,
) {
    ThreePaneScaffoldPredictiveBackHandler(
        navigator = navigator,
        backBehavior = defaultBackBehavior,
    )

    ListDetailPaneScaffold(
        modifier = modifier,
        directive = navigator.scaffoldDirective,
        scaffoldState = navigator.scaffoldState,
        detailPane = detailPane,
        listPane = listPane,
        extraPane = extraPane,
        paneExpansionDragHandle = paneExpansionDragHandle,
        paneExpansionState = paneExpansionState,
    )
}
```

An effect to add predictive back handling to a three pane scaffold.

```kotlin
@Composable
fun <T> NavigationHelper(
    navigator: ThreePaneScaffoldNavigator<T>,
    navigationState: NavigationState,
    coroutineScope: CoroutineScope
) {
    LaunchedEffect(navigator.canNavigateBack()) {
        navigationState.update(
            canNavigateBack =
                navigator.canNavigateBack(),
            navigateBack = {
                coroutineScope.launch {
                    navigator.navigateBack()
                }
            }
        )
    }
    DisposableEffect(Unit) {
        onDispose {
            navigationState.clear()
        }
    }
    BackHandler(navigator.canNavigateBack()) {
        coroutineScope.launch {
            navigator.navigateBack()
        }
    }
}
```

```kotlin
package de.thomaskuenneth.material.adaptive.multiplatform

import androidx.compose.runtime.Composable

@Composable
expect fun BackHandler(enabled: Boolean = true, onBack: () -> Unit)
```

```kotlin
package de.thomaskuenneth.material.adaptive.multiplatform

import androidx.activity.compose.BackHandler
import androidx.compose.runtime.Composable

@Composable
actual fun BackHandler(enabled: Boolean, onBack: () -> Unit) {
    BackHandler(enabled = enabled, onBack = onBack)
}
```

```kotlin
package de.thomaskuenneth.material.adaptive.multiplatform

import androidx.compose.runtime.Composable

@Composable
actual fun BackHandler(enabled: Boolean, onBack: () -> Unit) {
}
```

Finishing line

- Supporting different form factors used to be a pain on Android
- Google neglected tablets for way too long
- The rise of foldables provided a second chance
- Google took it, finally investing in adaptive UIs (Material 3, Window Size Classes, Jetpack Window Manager)

- Material 3 provides the adaptive theory
- Jetpack libraries provide the implementation
- Compose Multiplatform relies on Jetpack Compose, so it benefits from (almost) all of this

- Advanced integrations still need platform-specific code (menu bars, multiple windows, etc.)
- But, building responsive, shared-codebase apps for Android, iOS, and Desktop is much easier with Compose Multiplatform

Thank you!

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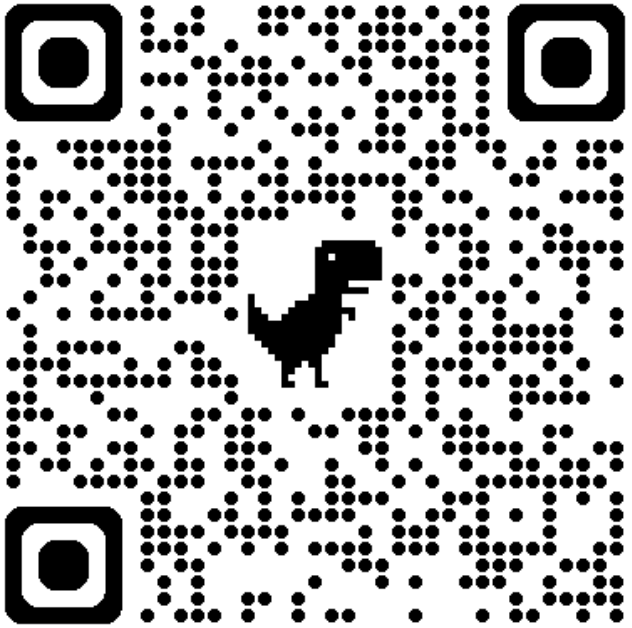

https://github.com/tkuenneth/foldables_and_large_screens

Experts

SnappMobile