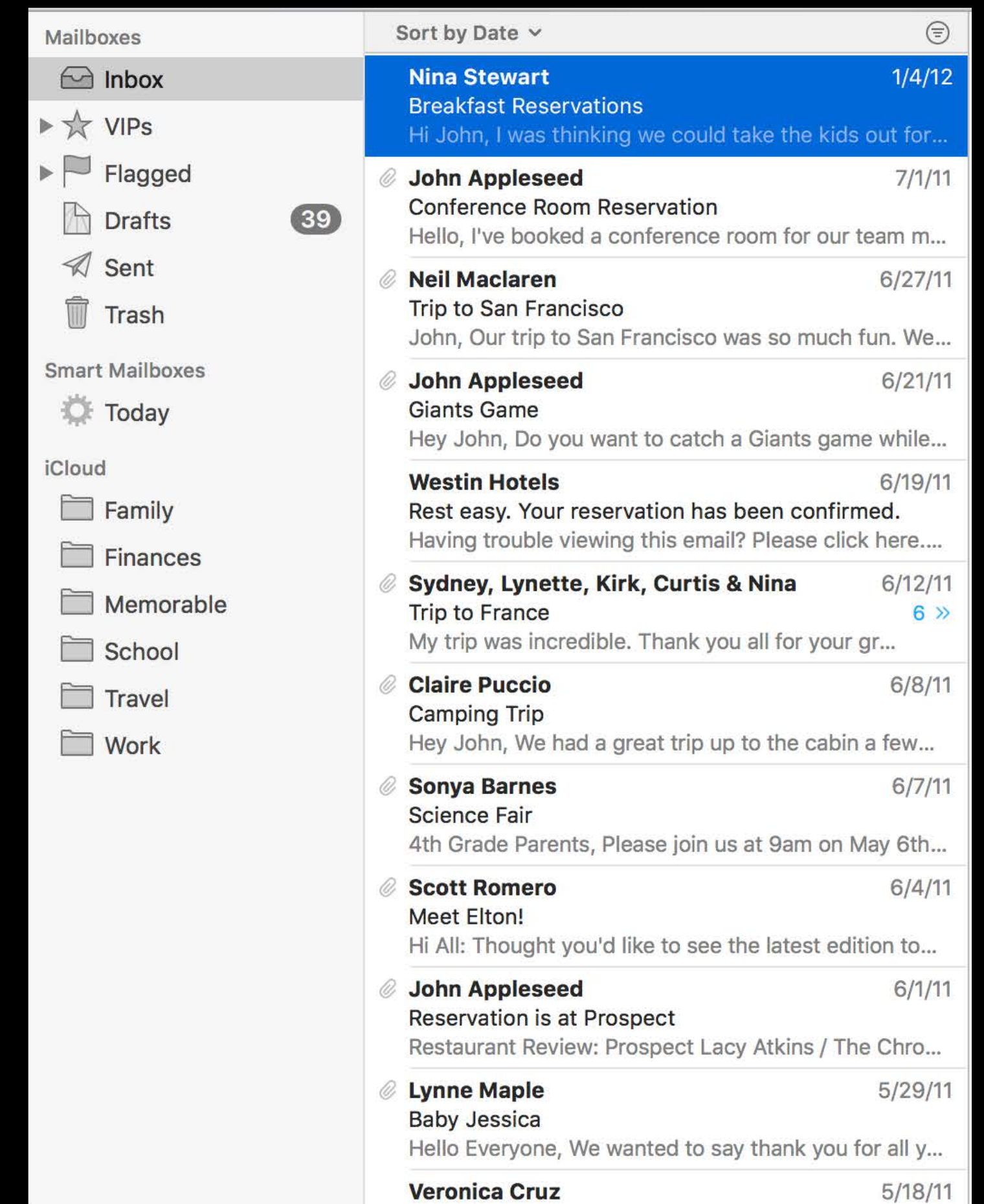
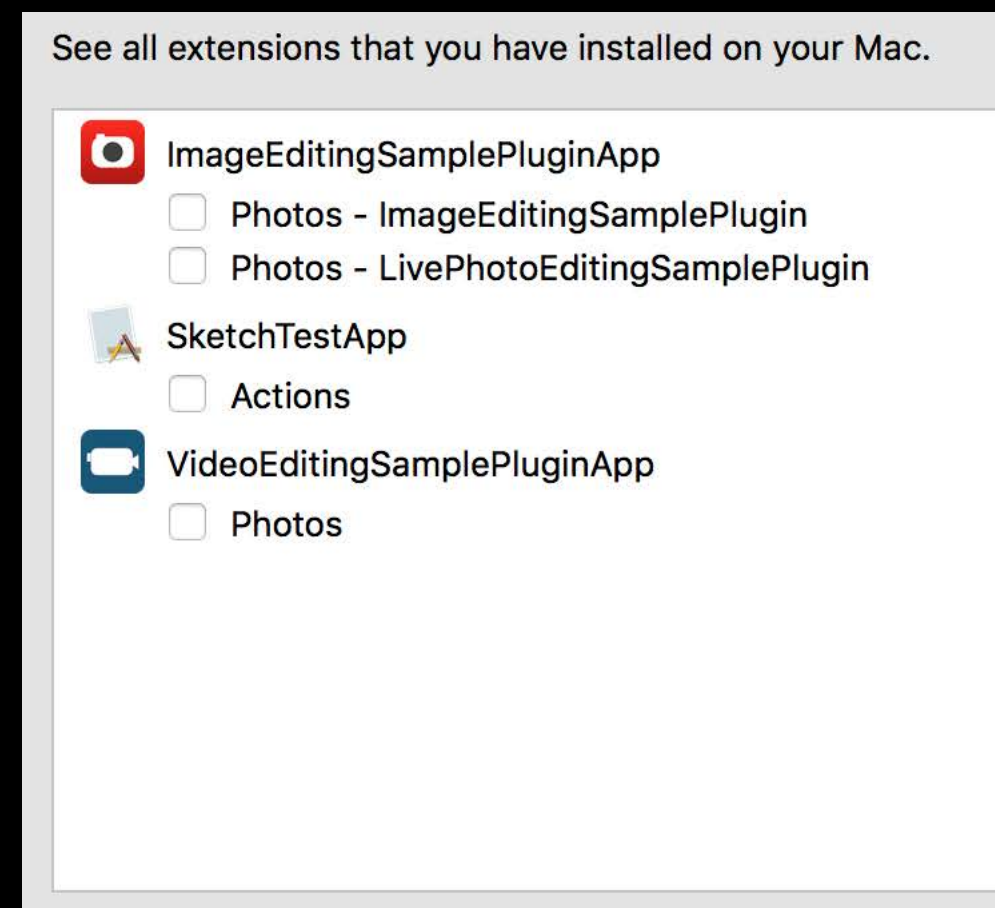
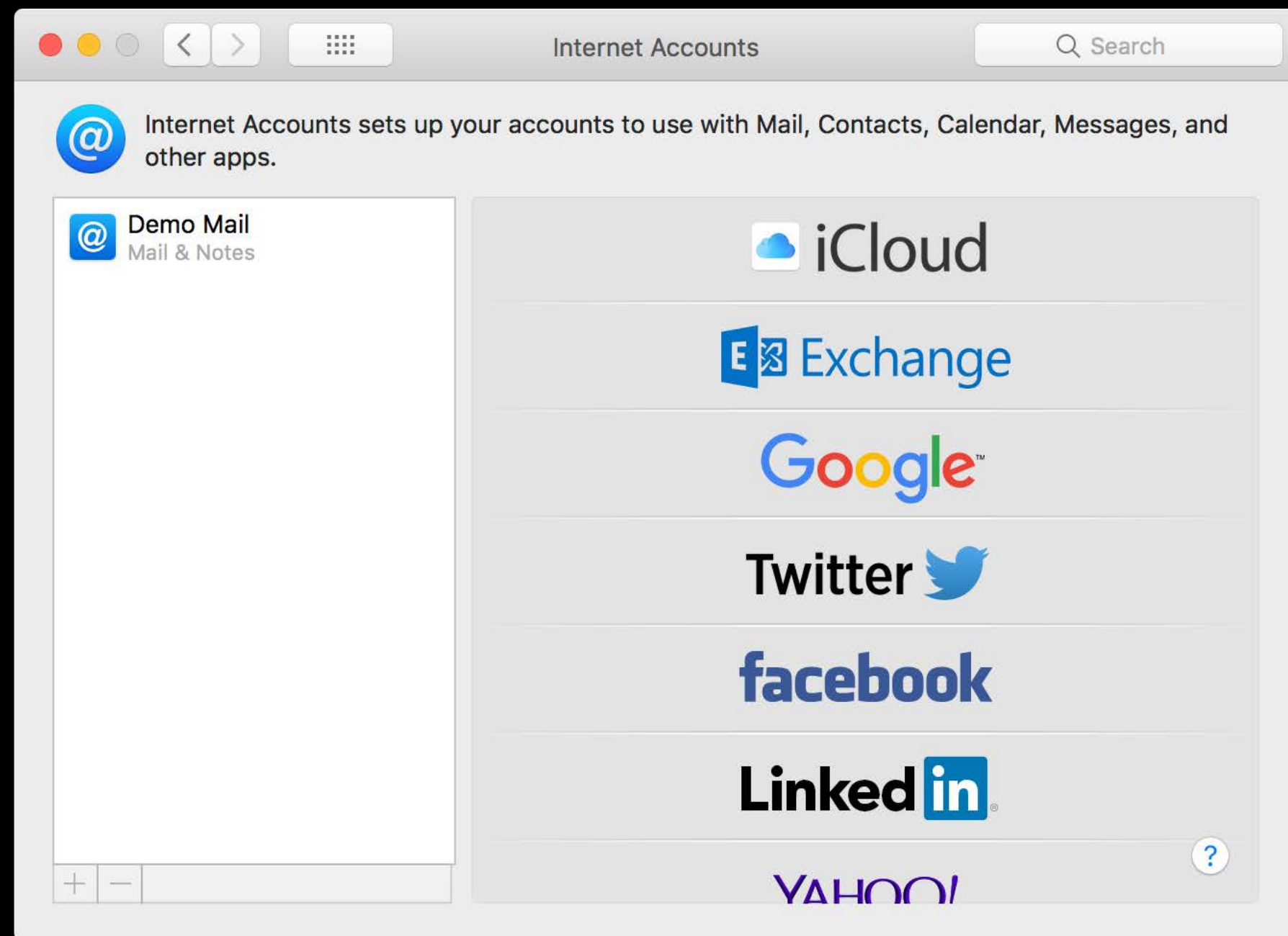


# Choosing the Right Cocoa Container View

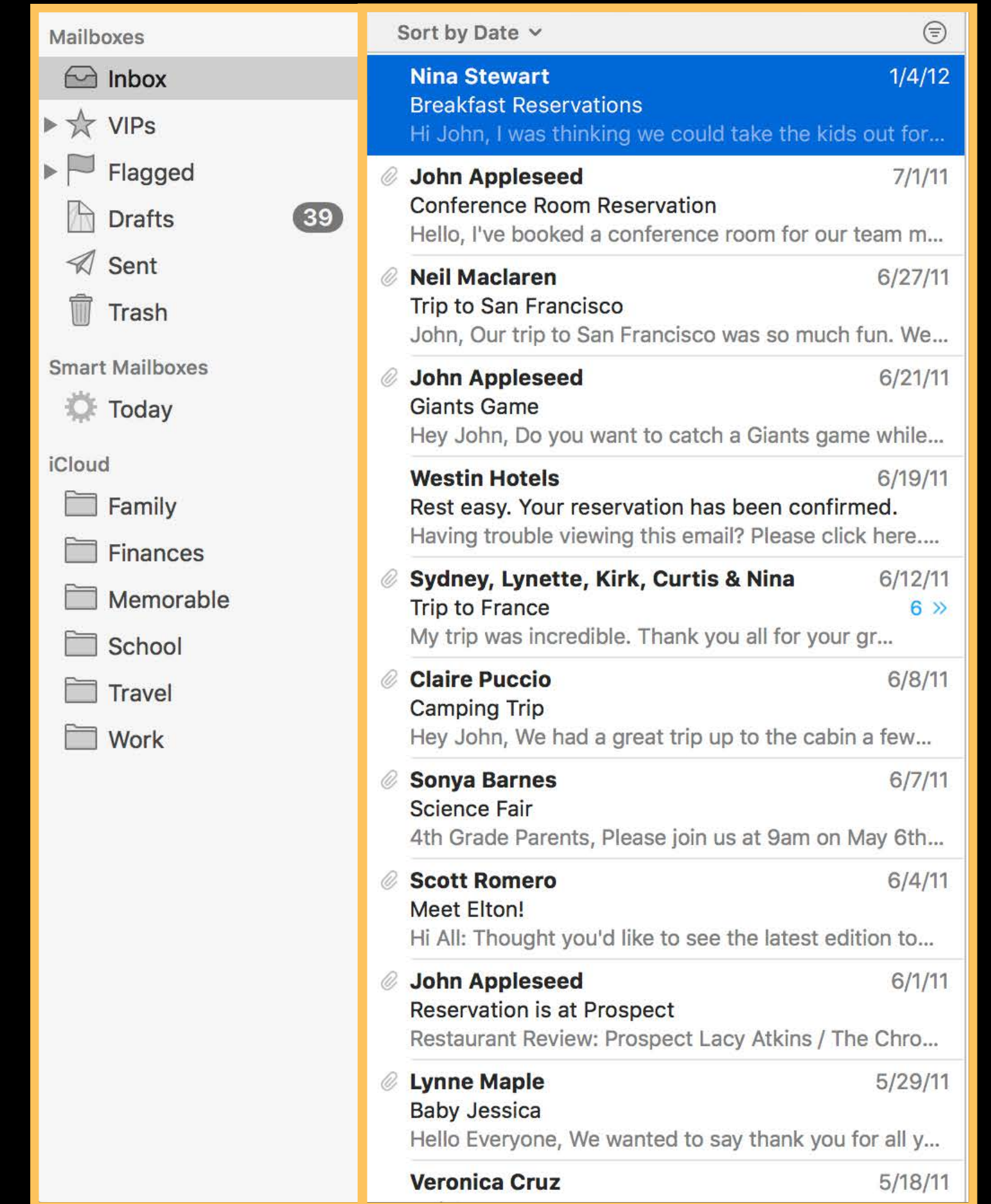
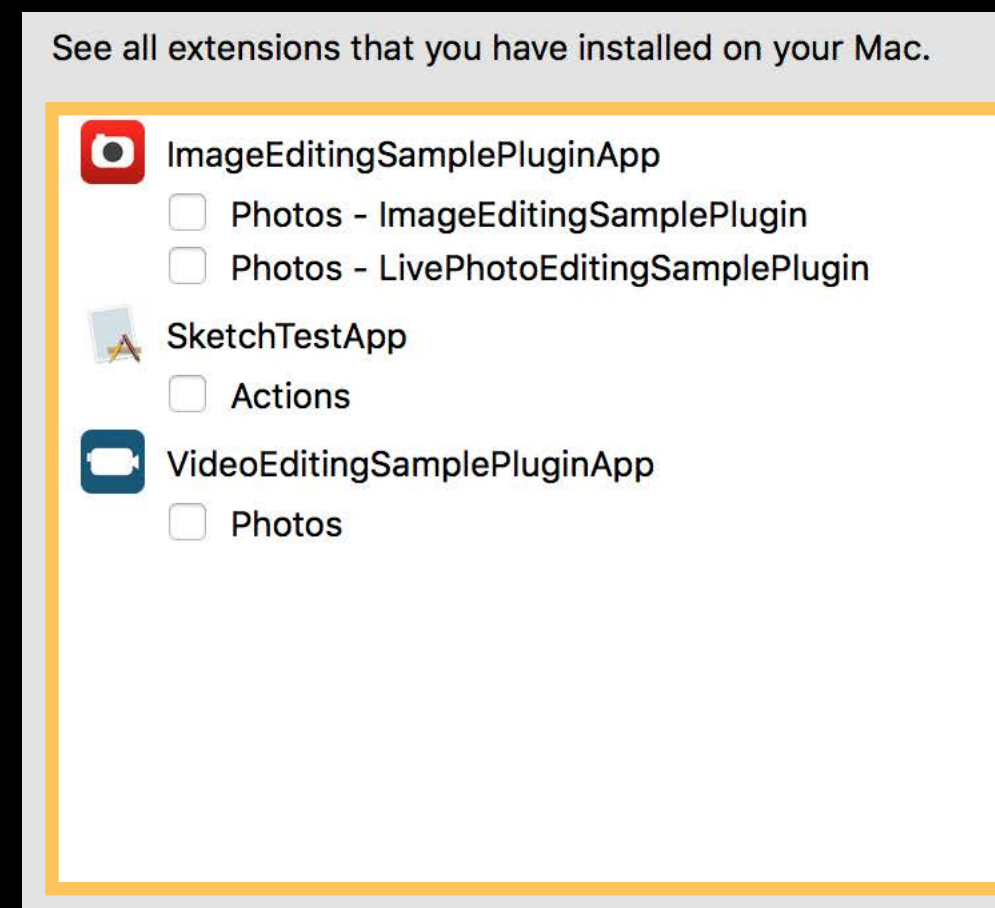
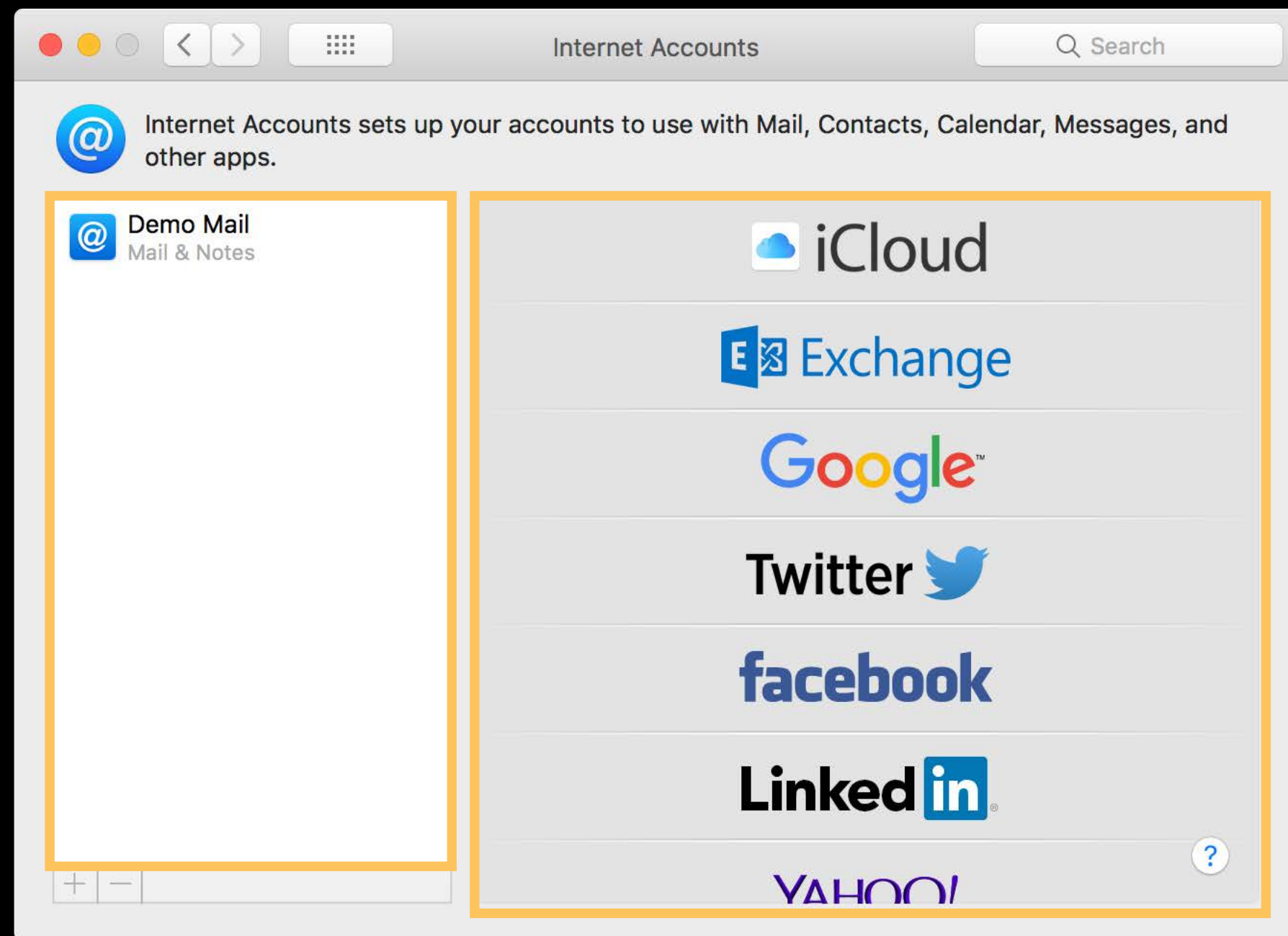
Raleigh Ledet, AppKit Engineer  
Troy Stephens, AppKit Engineer

**Let's Play a Game**

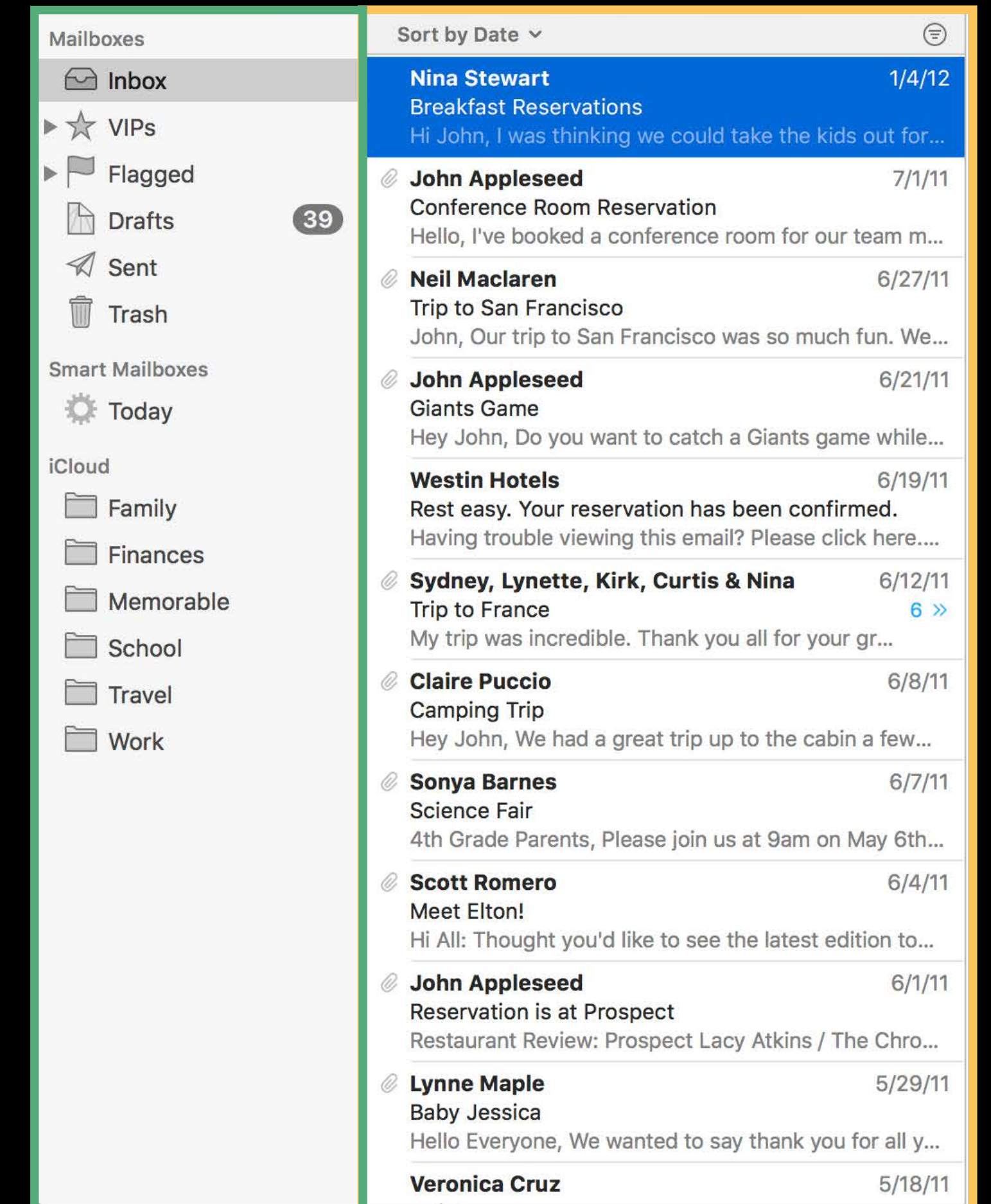
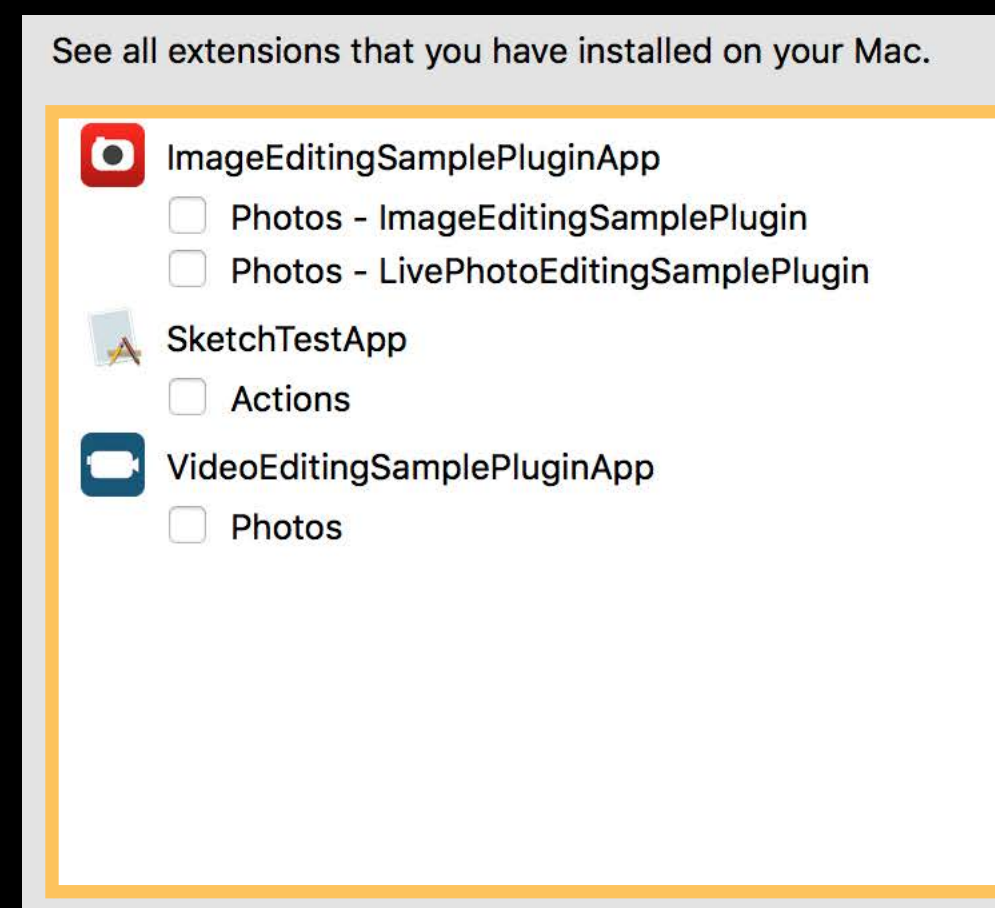
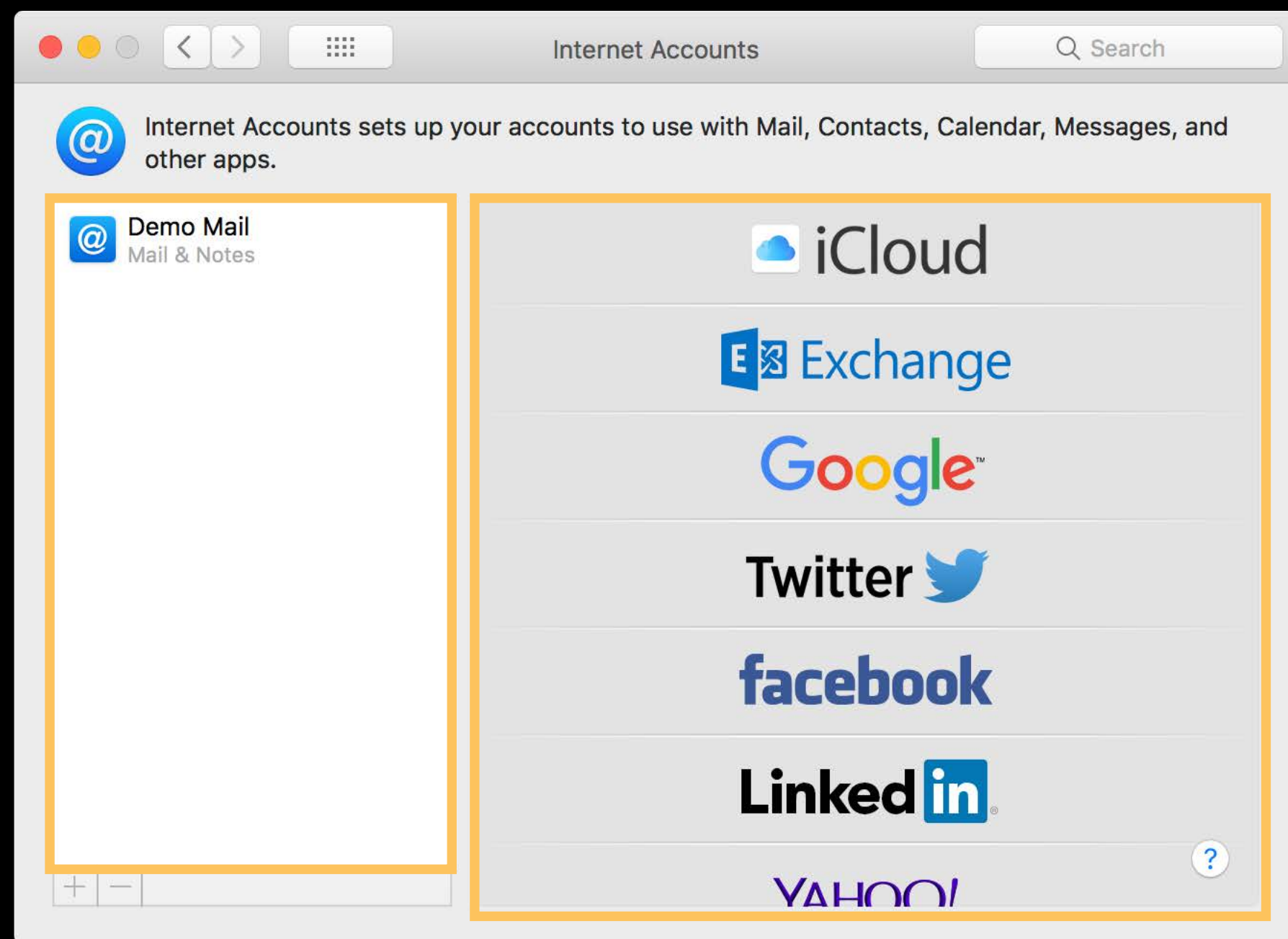
# Which of These is Not Like the Other...



# Which of These is Not Like the Other...



# Which of These is Not Like the Other...



# Which of These is Not Like the Other...

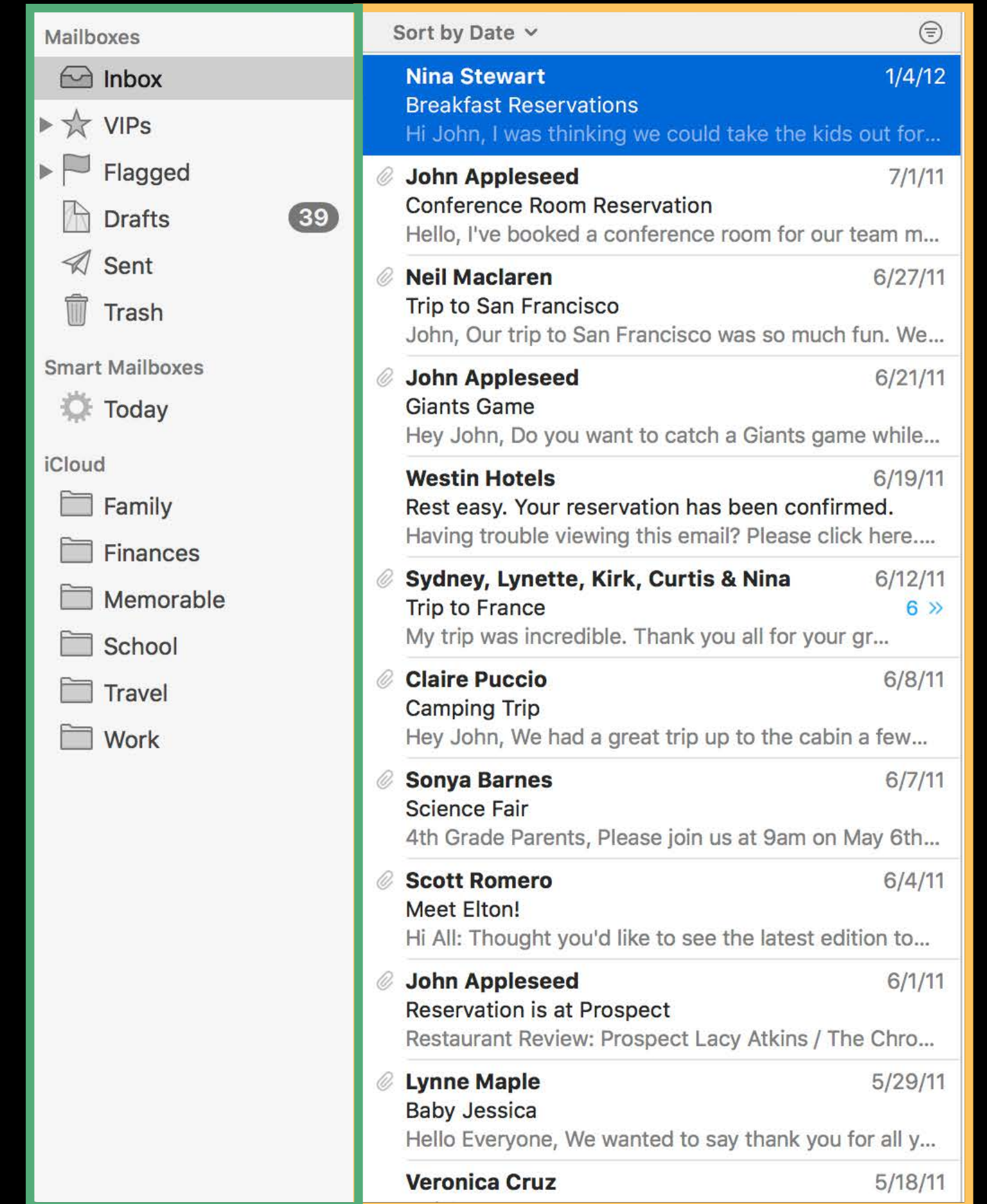
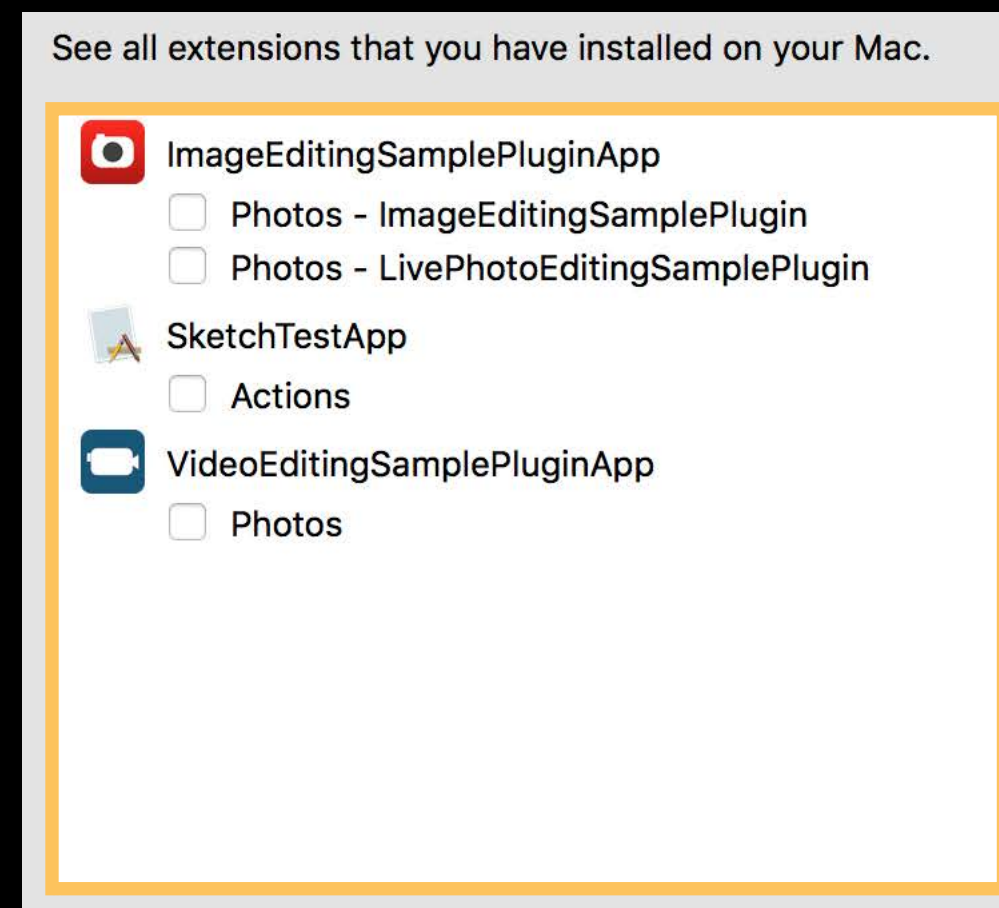
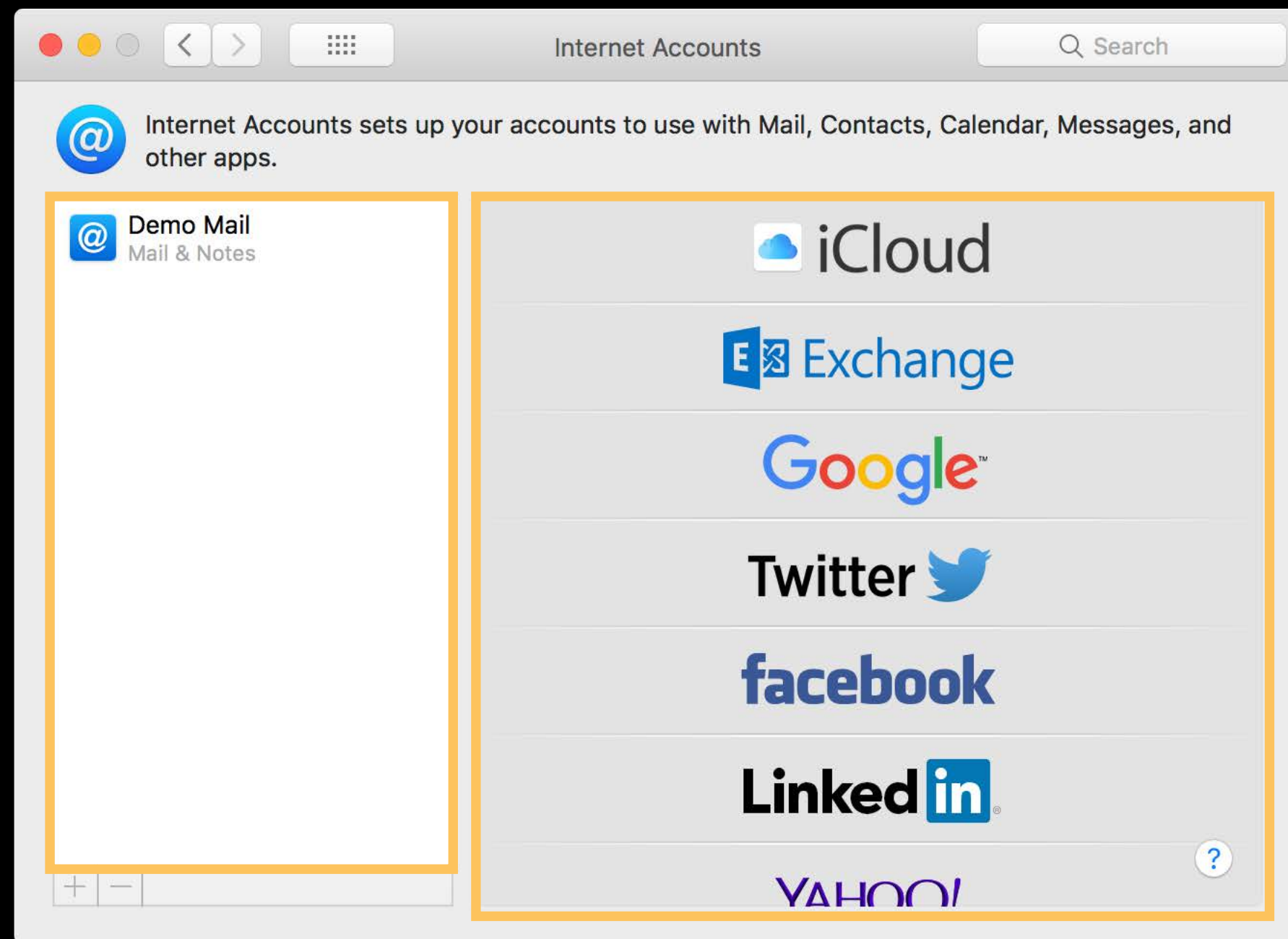
NSTableView

NSTableView

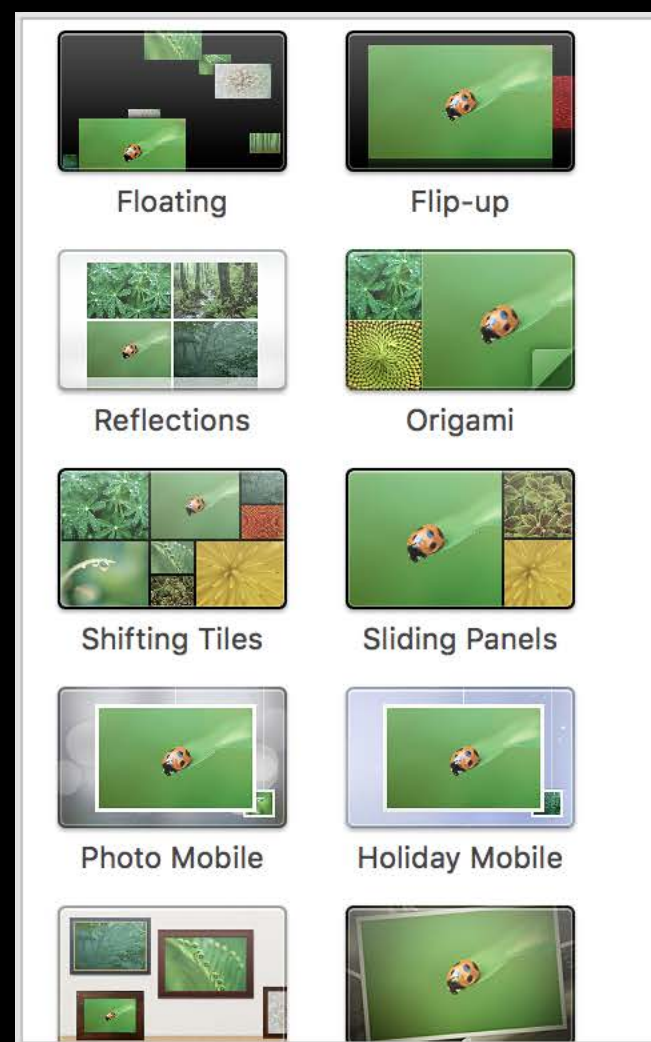
NSTableView

NSOutlineView

NSTableView



# Which of These is Not Like the Other...



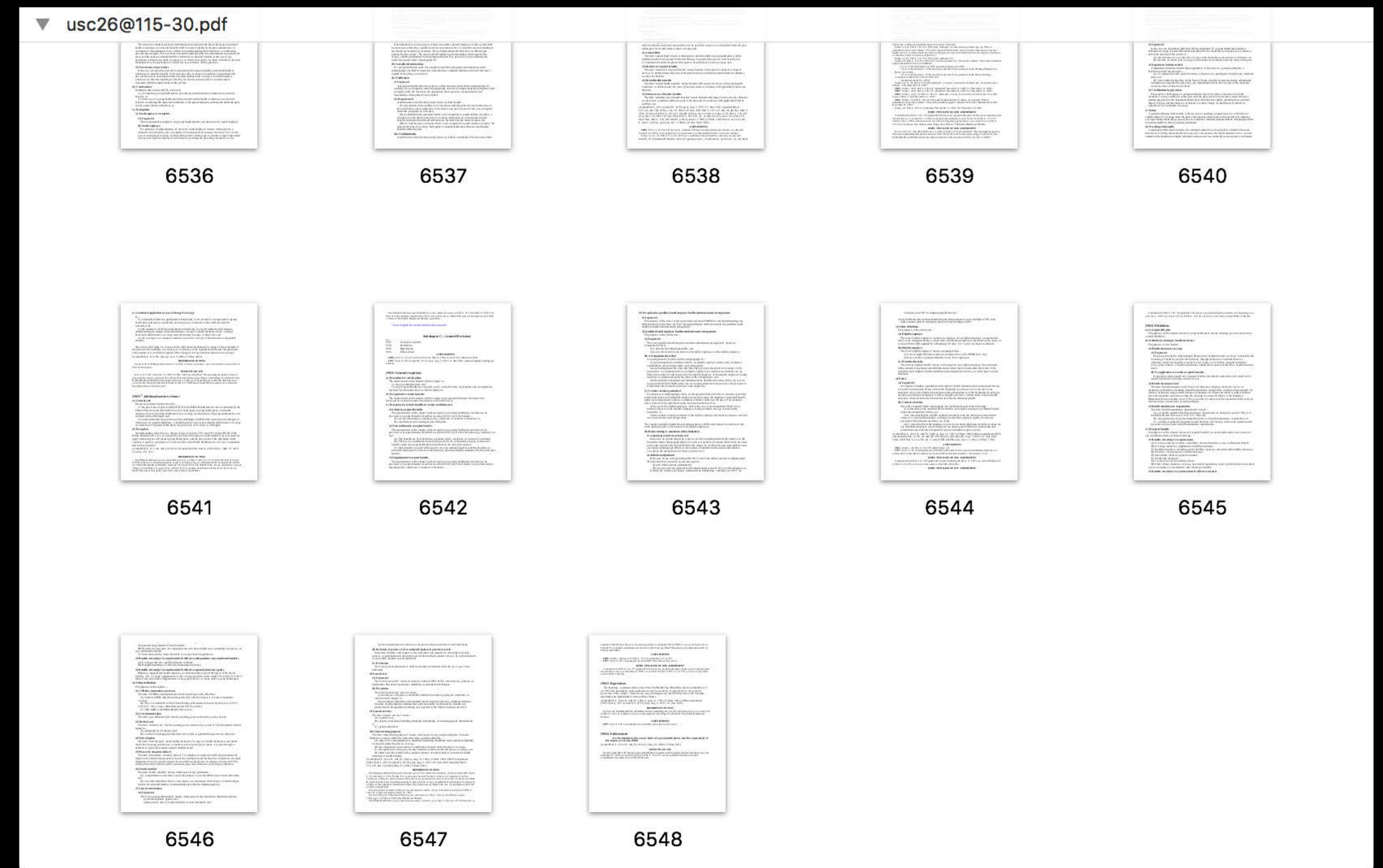
**Subject Name** \_\_\_\_\_  
**Country** IL  
**Organization** StartCom Ltd.  
**Organizational Unit** Secure Digital Certificate Signing  
**Common Name** StartCom Certification Authority

**Issuer Name** \_\_\_\_\_  
**Country** IL  
**Organization** StartCom Ltd.  
**Organizational Unit** Secure Digital Certificate Signing  
**Common Name** StartCom Certification Authority

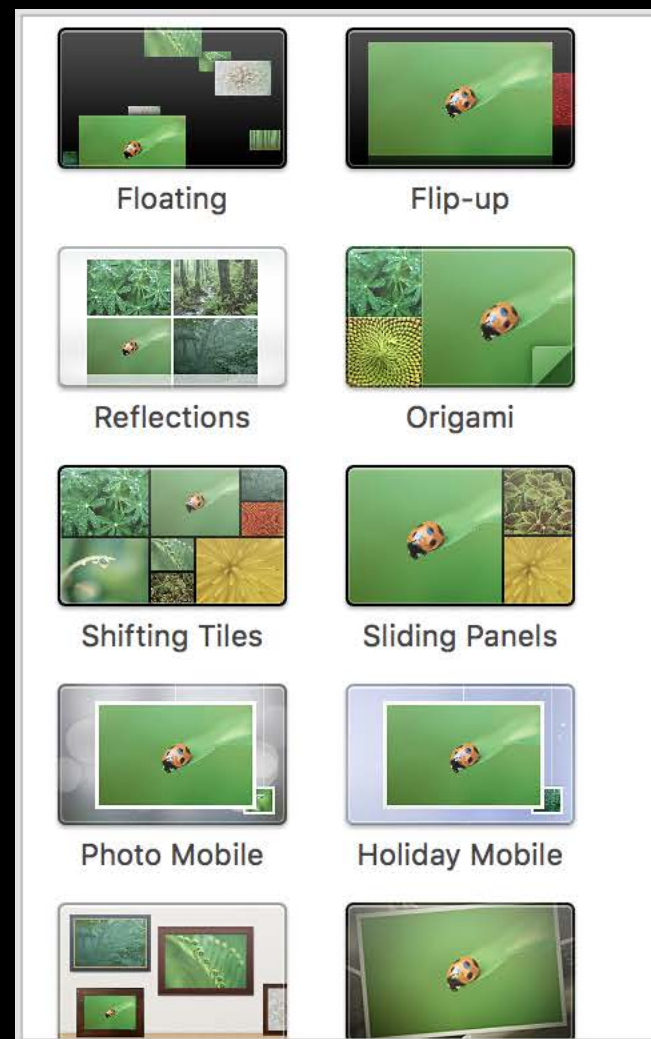
**Serial Number** 1  
**Version** 3  
**Signature Algorithm** ( 1.2.840.113549.1.1.5 )  
**Parameters** None

**Not Valid Before** Sunday, September 17, 2006 at 2:46:36 PM Central Daylight Time  
**Not Valid After** Wednesday, September 17, 2036 at 2:46:36 PM Central Daylight Time

**Public Key Info** \_\_\_\_\_  
**Algorithm** RSA Encryption ( 1.2.840.113549.1.1.1 )  
**Parameters** None  
**Public Key** 512 bytes : C1 88 DB 09 BC 6C 46 7C ...  
**Exponent** 65537  
**Key Size** 4,096 bits



# Which of These is Not Like the Other...



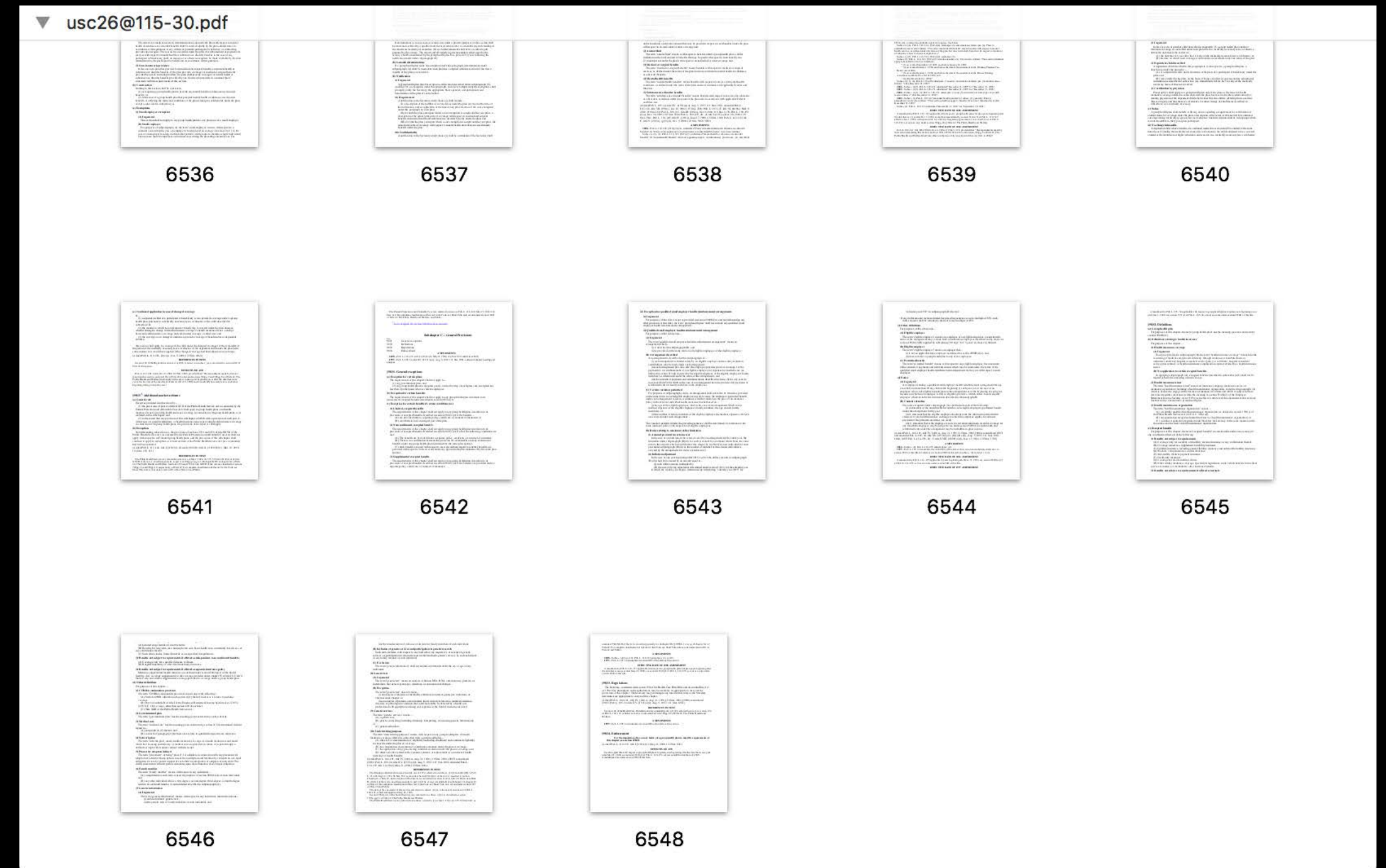
**Subject Name** \_\_\_\_\_  
**Country** IL  
**Organization** StartCom Ltd.  
**Organizational Unit** Secure Digital Certificate Signing  
**Common Name** StartCom Certification Authority

**Issuer Name** \_\_\_\_\_  
**Country** IL  
**Organization** StartCom Ltd.  
**Organizational Unit** Secure Digital Certificate Signing  
**Common Name** StartCom Certification Authority

**Serial Number** 1  
**Version** 3  
**Signature Algorithm** ( 1.2.840.113549.1.1.5 )  
**Parameters** None

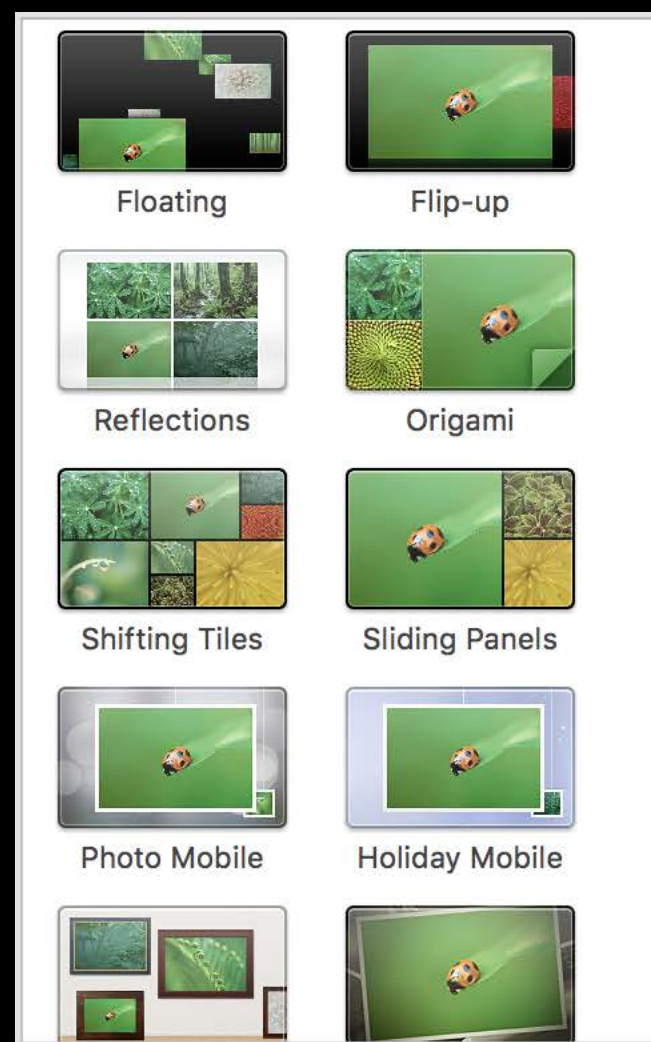
**Not Valid Before** Sunday, September 17, 2006 at 2:46:36 PM Central Daylight Time  
**Not Valid After** Wednesday, September 17, 2036 at 2:46:36 PM Central Daylight Time

**Public Key Info** \_\_\_\_\_  
**Algorithm** RSA Encryption ( 1.2.840.113549.1.1.1 )  
**Parameters** None  
**Public Key** 512 bytes : C1 88 DB 09 BC 6C 46 7C ...  
**Exponent** 65537  
**Key Size** 4,096 bits





# Which of These is Not Like the Other...



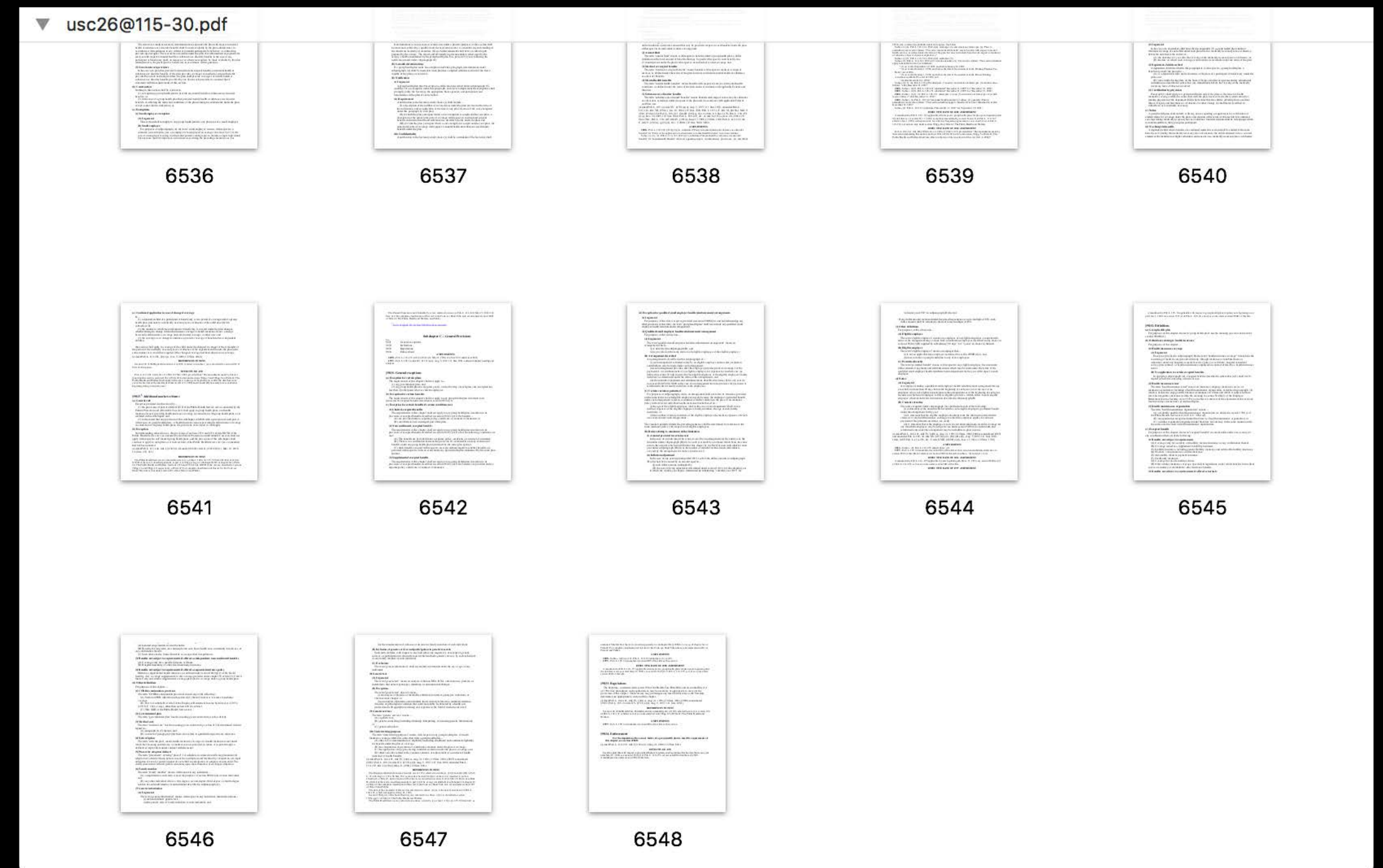
**Subject Name** \_\_\_\_\_  
**Country** IL  
**Organization** StartCom Ltd.  
**Organizational Unit** Secure Digital Certificate Signing  
**Common Name** StartCom Certification Authority

**Issuer Name** \_\_\_\_\_  
**Country** IL  
**Organization** StartCom Ltd.  
**Organizational Unit** Secure Digital Certificate Signing  
**Common Name** StartCom Certification Authority

**Serial Number** 1  
**Version** 3  
**Signature Algorithm** ( 1.2.840.113549.1.1.5 )  
**Parameters** None

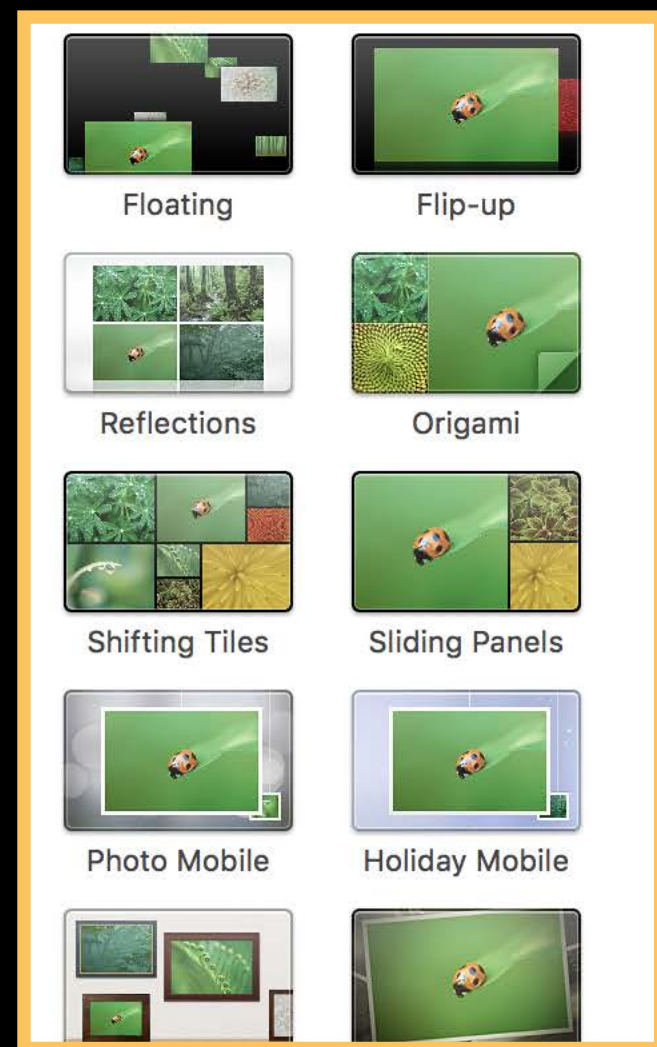
**Not Valid Before** Sunday, September 17, 2006 at 2:46:36 PM Central Daylight Time  
**Not Valid After** Wednesday, September 17, 2036 at 2:46:36 PM Central Daylight Time

**Public Key Info** \_\_\_\_\_  
**Algorithm** RSA Encryption ( 1.2.840.113549.1.1.1 )  
**Parameters** None  
**Public Key** 512 bytes : C1 88 DB 09 BC 6C 46 7C ...  
**Exponent** 65537  
**Key Size** 4,096 bits



# Which of These is Not Like the Other...

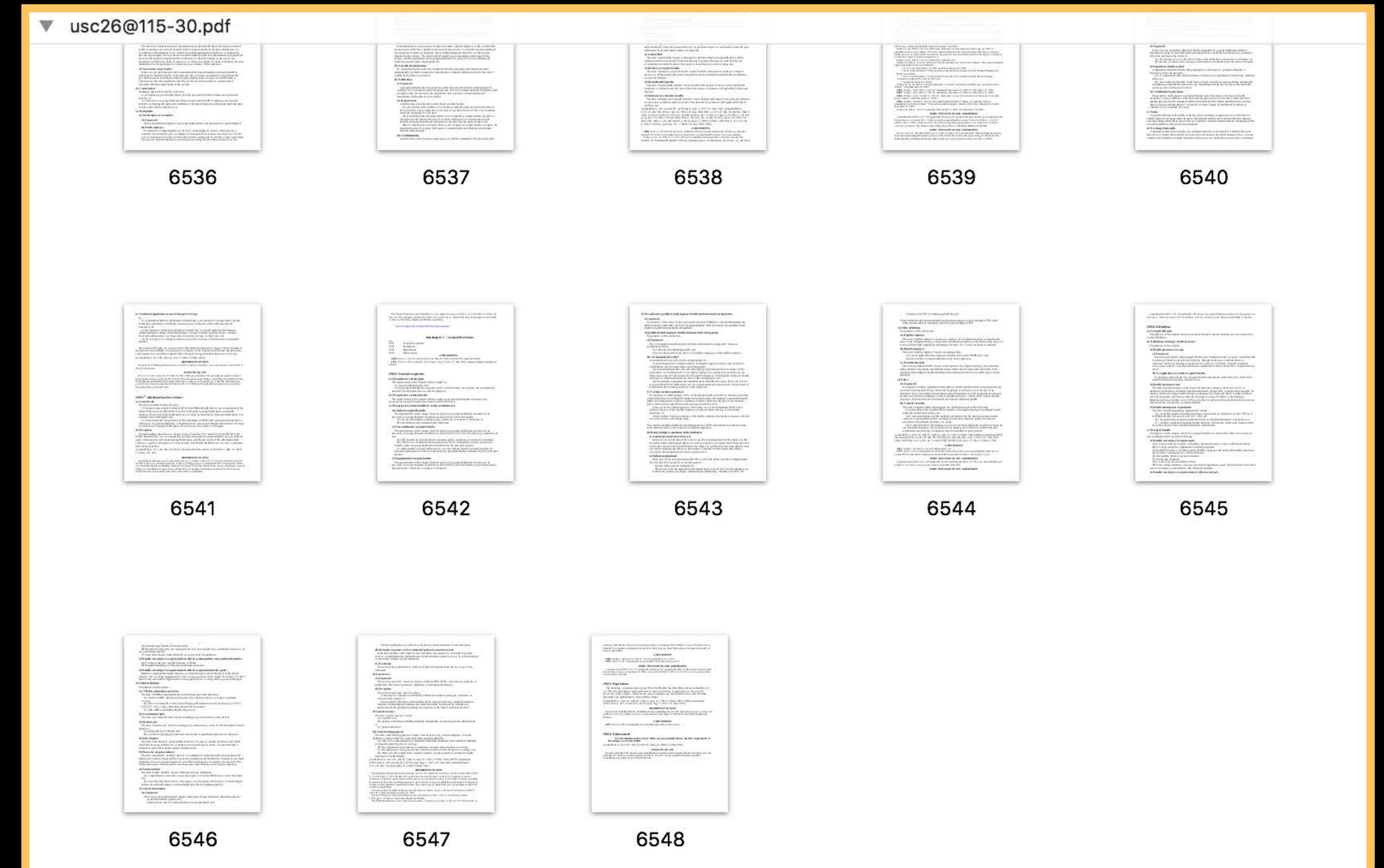
## NSCollectionView



## NSGridView

<b>Subject Name</b>	
<b>Country</b>	IL
<b>Organization</b>	StartCom Ltd.
<b>Organizational Unit</b>	Secure Digital Certificate Signing
<b>Common Name</b>	StartCom Certification Authority
<hr/>	
<b>Issuer Name</b>	
<b>Country</b>	IL
<b>Organization</b>	StartCom Ltd.
<b>Organizational Unit</b>	Secure Digital Certificate Signing
<b>Common Name</b>	StartCom Certification Authority
<hr/>	
<b>Serial Number</b>	1
<b>Version</b>	3
<b>Signature Algorithm</b>	( 1.2.840.113549.1.1.5 )
<b>Parameters</b>	None
<b>Not Valid Before</b>	Sunday, September 17, 2006 at 2:46:36 PM Central Daylight Time
<b>Not Valid After</b>	Wednesday, September 17, 2036 at 2:46:36 PM Central Daylight Time
<hr/>	
<b>Public Key Info</b>	
<b>Algorithm</b>	RSA Encryption ( 1.2.840.113549.1.1.1 )
<b>Parameters</b>	None
<b>Public Key</b>	512 bytes : C1 88 DB 09 BC 6C 46 7C ...
<b>Exponent</b>	65537
<b>Key Size</b>	4,096 bits

## NSCollectionView



# Agenda

Container view tour

- `NSStackView`, `NSGridView`
- `NSTableView`, `NSOutlineView`, `NSBrowser`, `NSCollectionView`

Choosing the right container view

Case studies

# Let's Unpack Some Container Views

Troy Stephens, AppKit Engineer

# Fundamentals

# Fundamentals

Present content

# Fundamentals

Present content

Apply desired layout

# Fundamentals

Present content

Apply desired layout

Keep it simple, reuse common solutions



# Fundamentals

Present content

Apply desired layout

Keep it simple, reuse common solutions

Accommodate arbitrary content

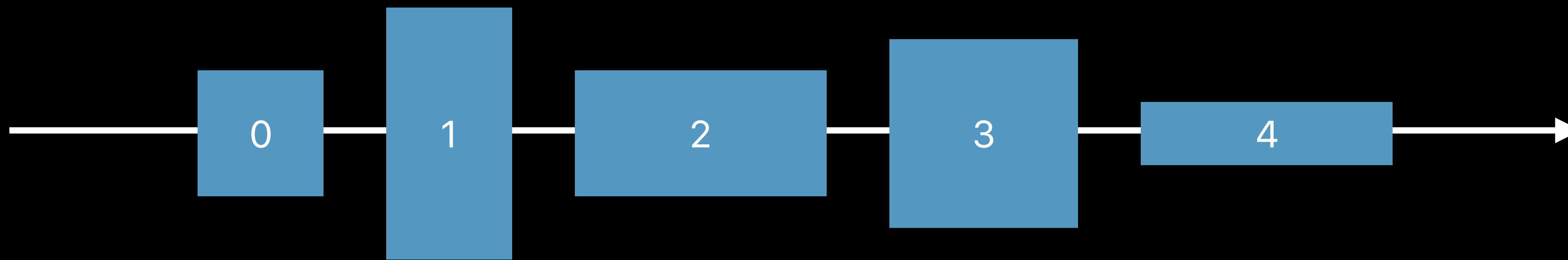
0

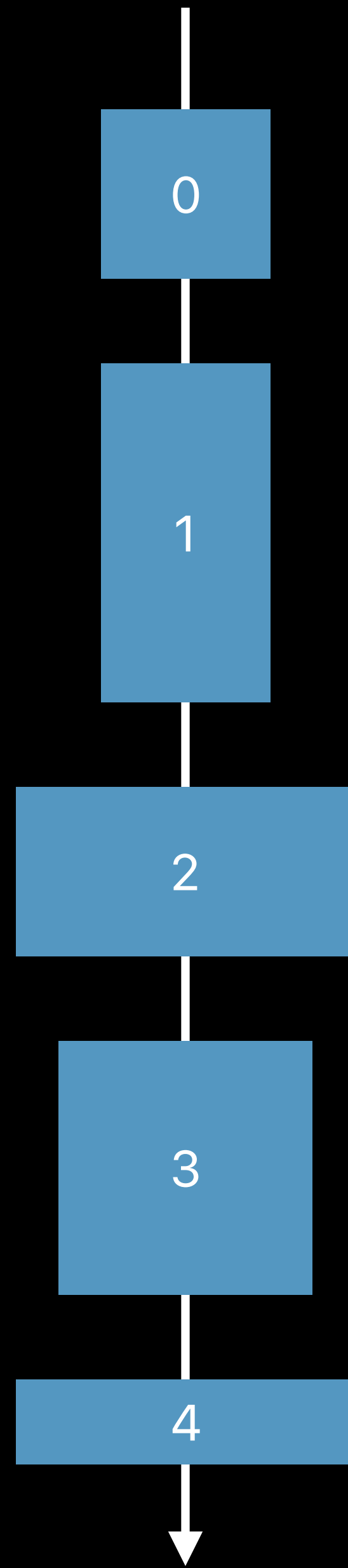
1

3

4

2





0

1

2

3

4

0

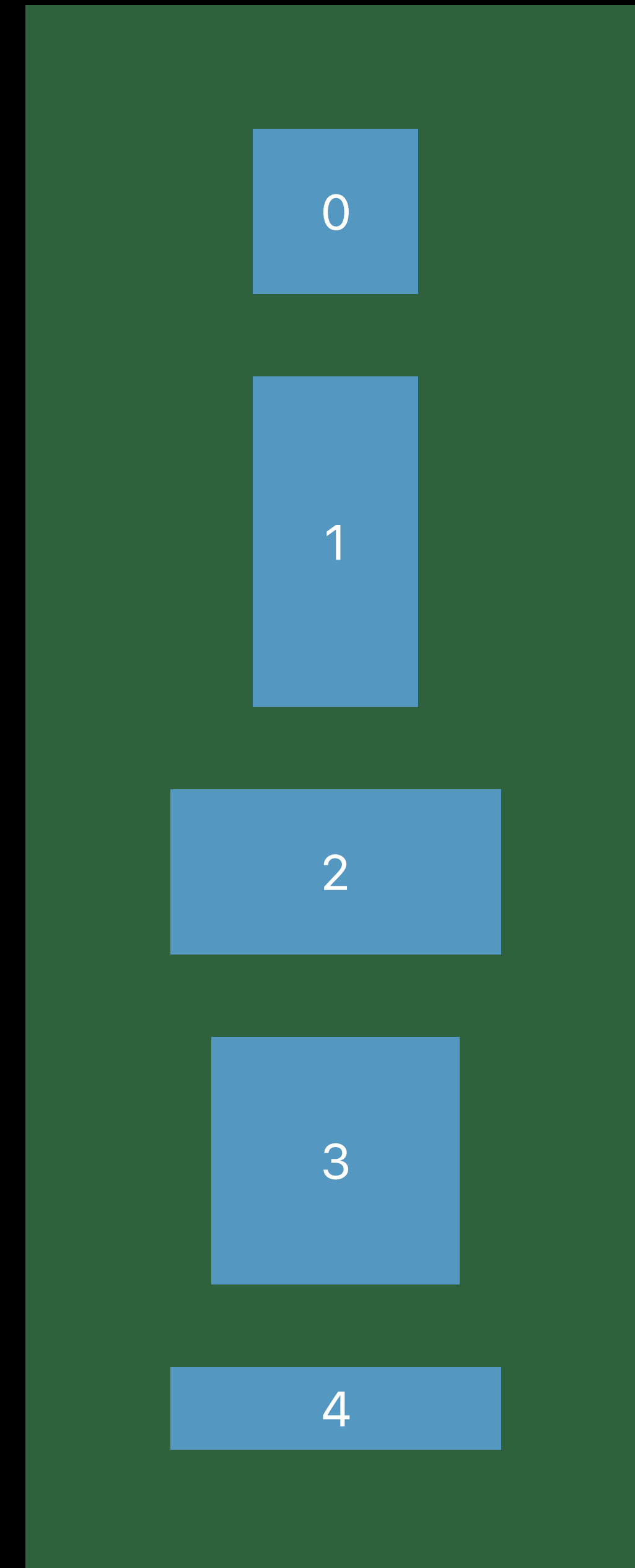
1

2

3

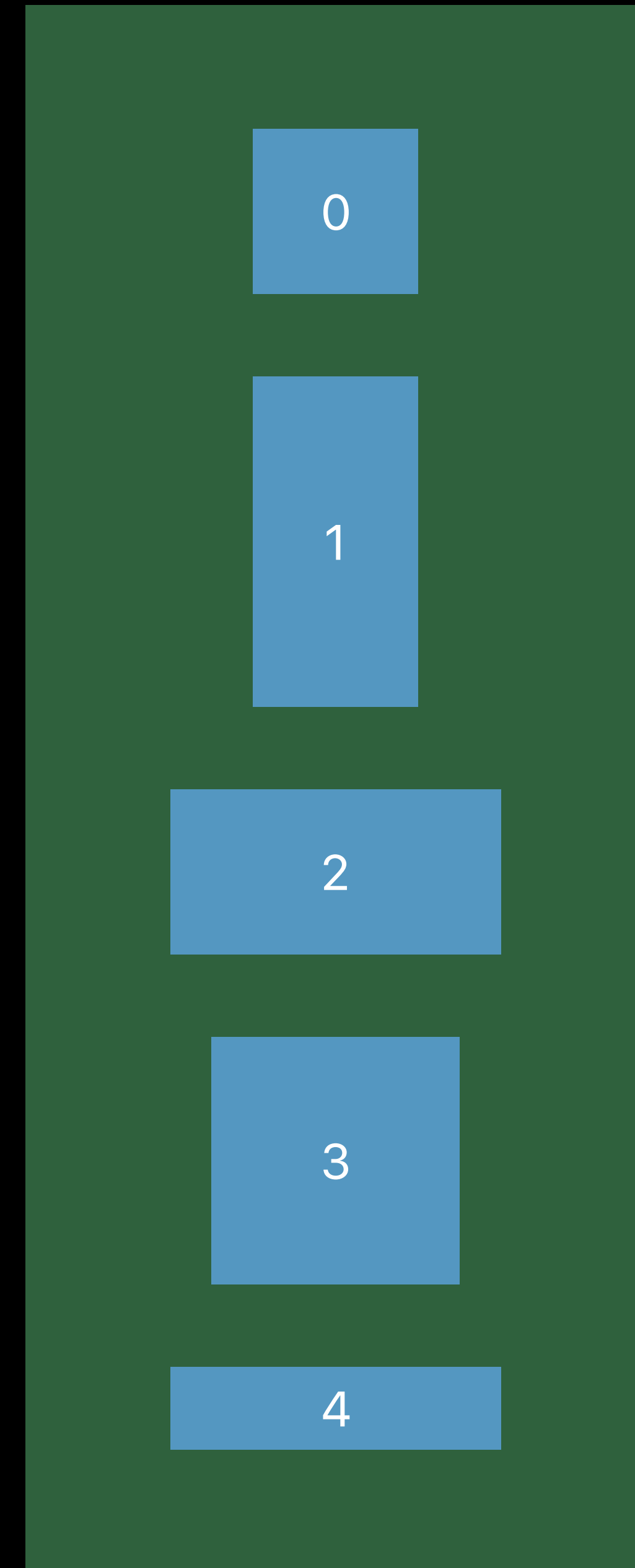
4

# NSStackView



# NSStackView

Flows views in a single column or row

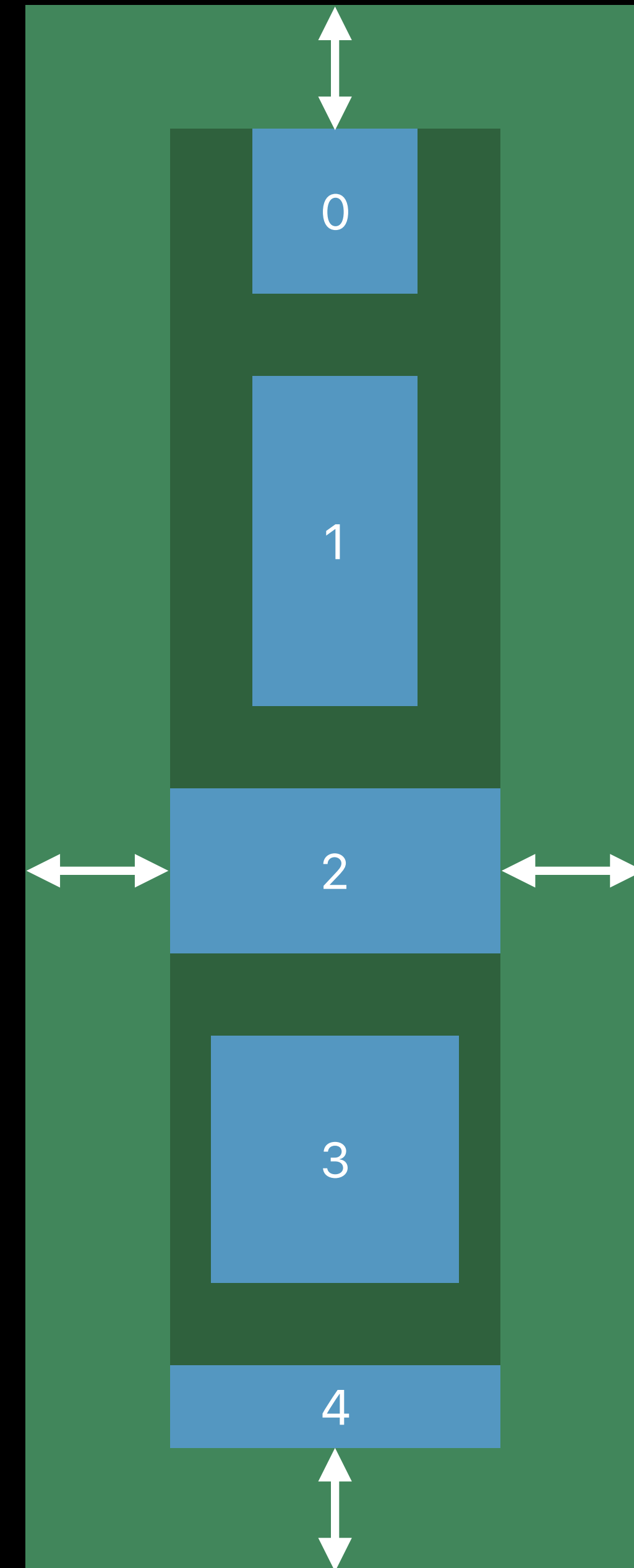




# NSStackView

Flows views in a single column or row

Configurable edge insets

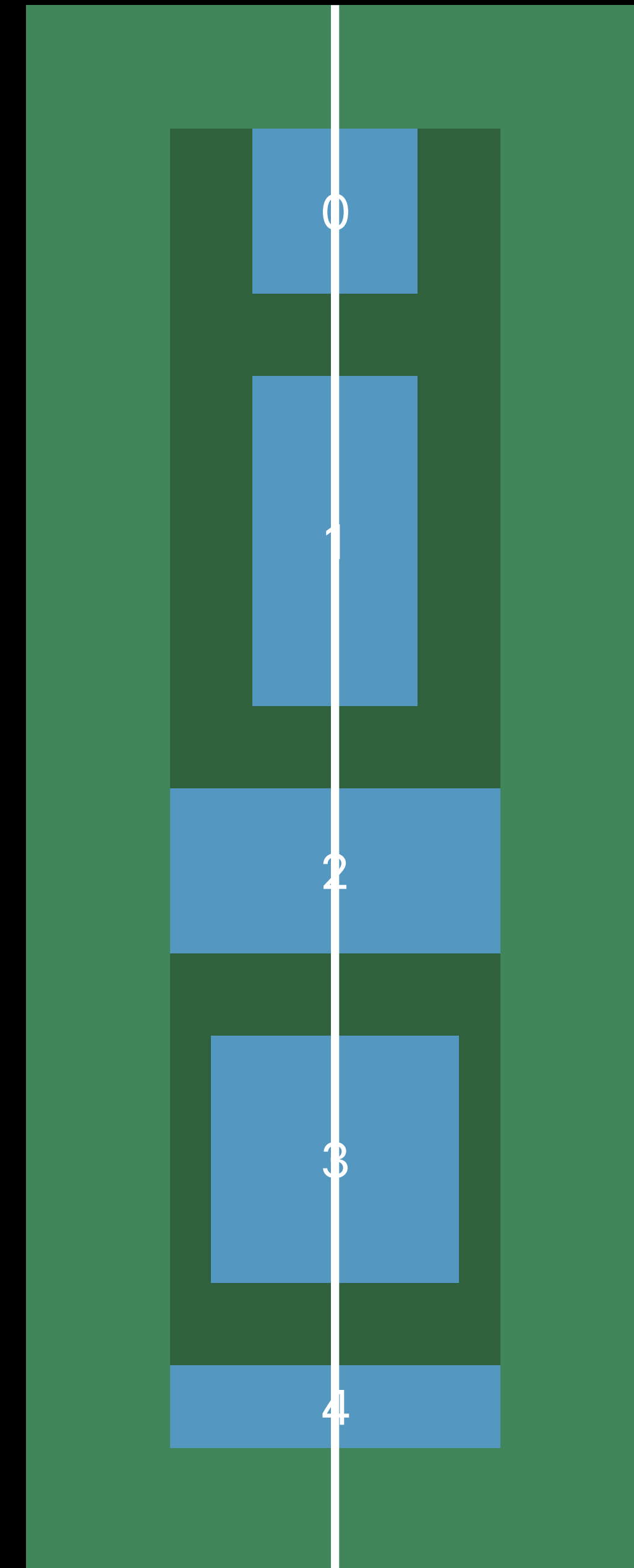


# NSStackView

Flows views in a single column or row

Configurable edge insets

Configurable alignment

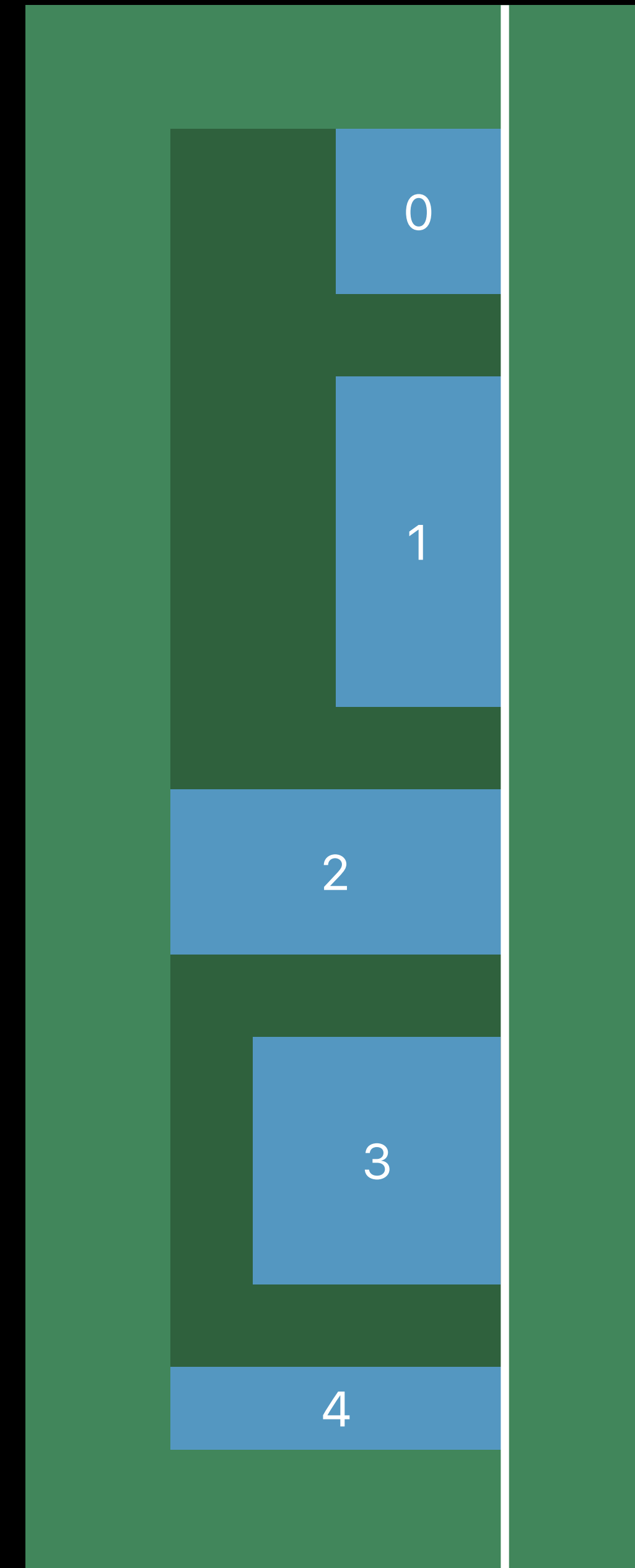


# NSStackView

Flows views in a single column or row

Configurable edge insets

Configurable alignment

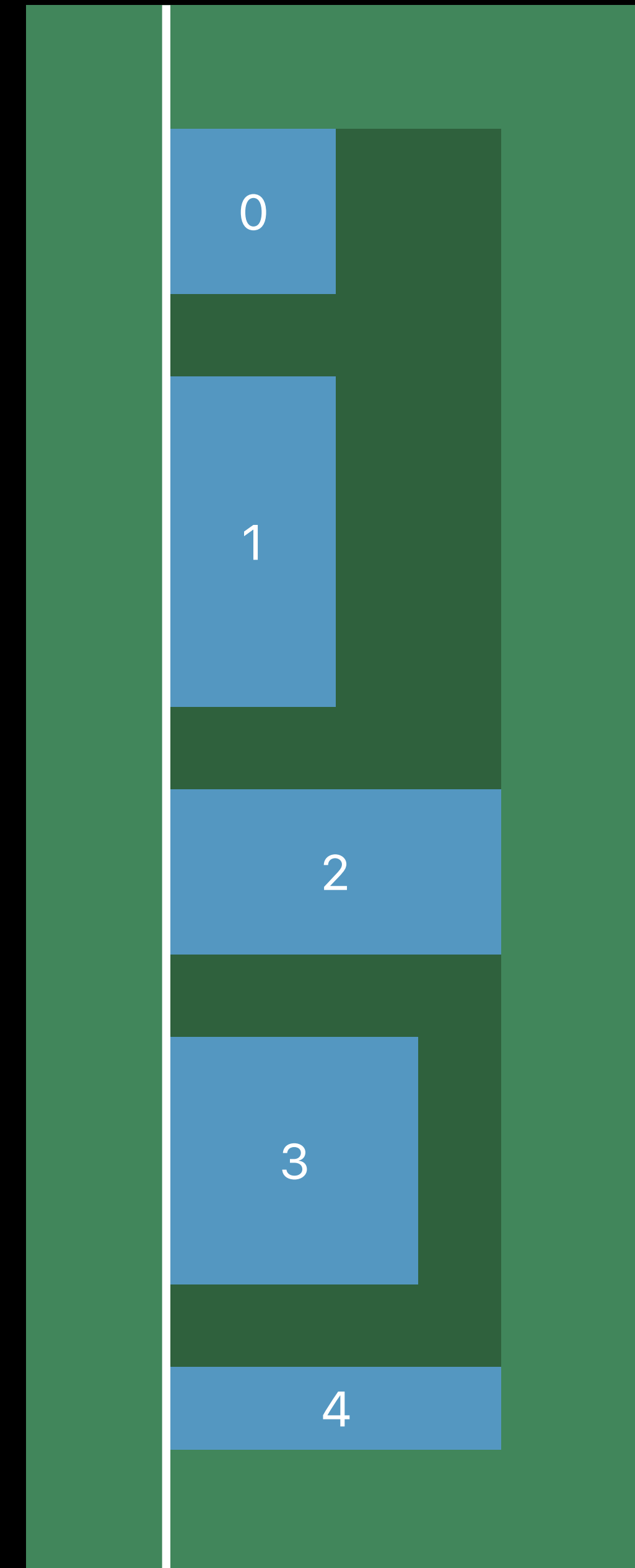


# NSStackView

Flows views in a single column or row

Configurable edge insets

Configurable alignment

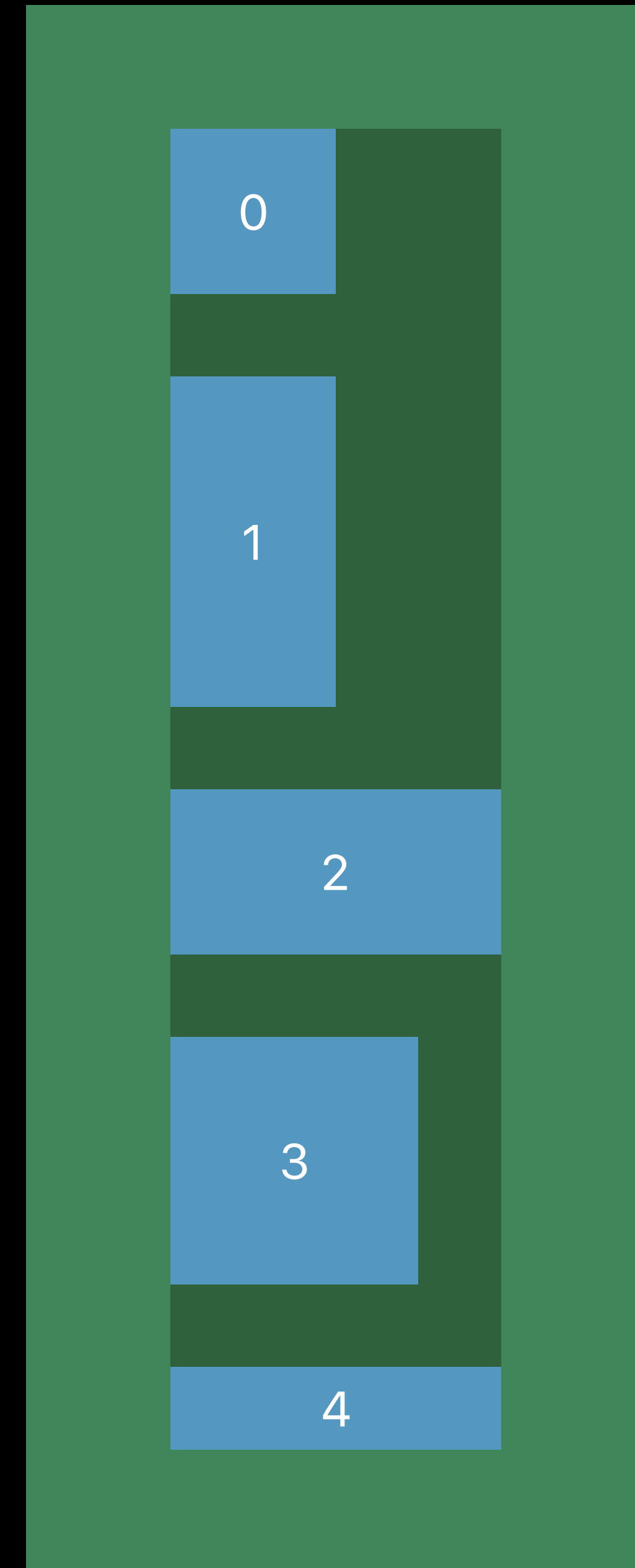


# NSStackView

Flows views in a single column or row

Configurable edge insets

Configurable alignment



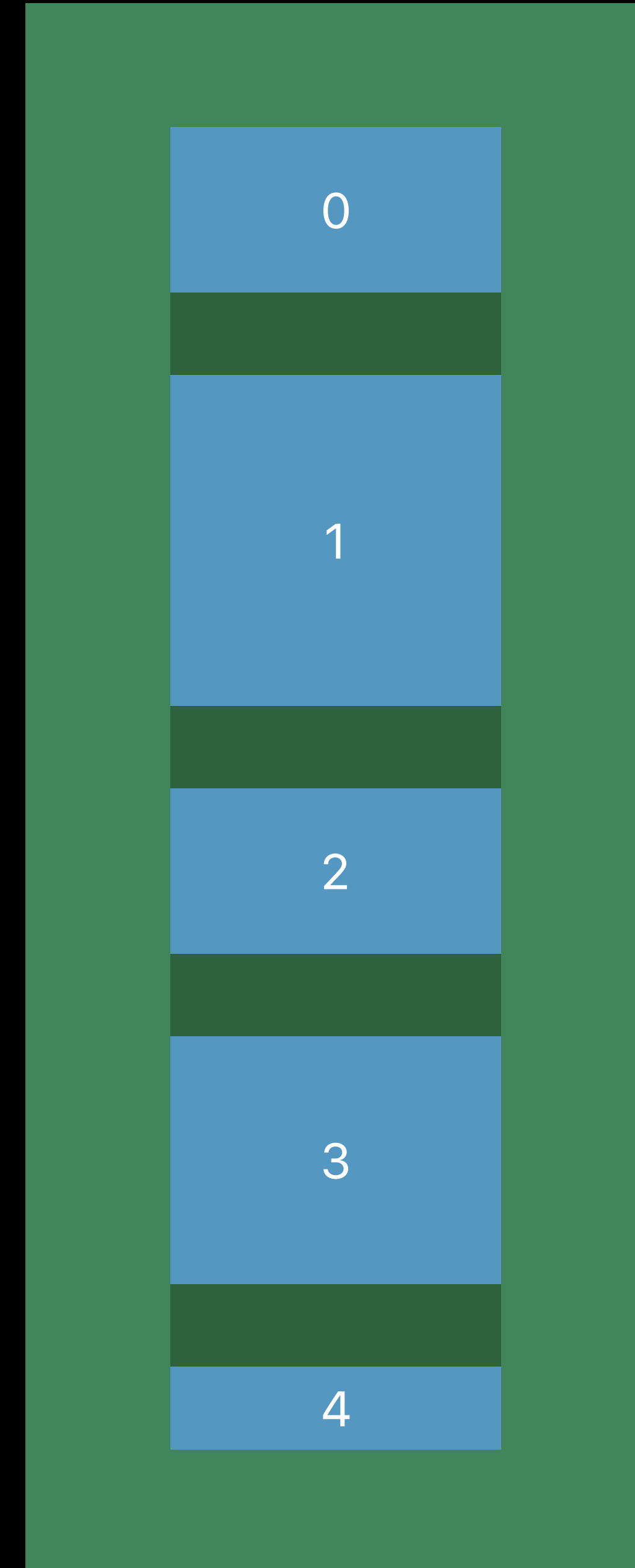
# NSStackView

Flows views in a single column or row

Configurable edge insets

Configurable alignment

Optionally fill cross dimension



# NSStackView

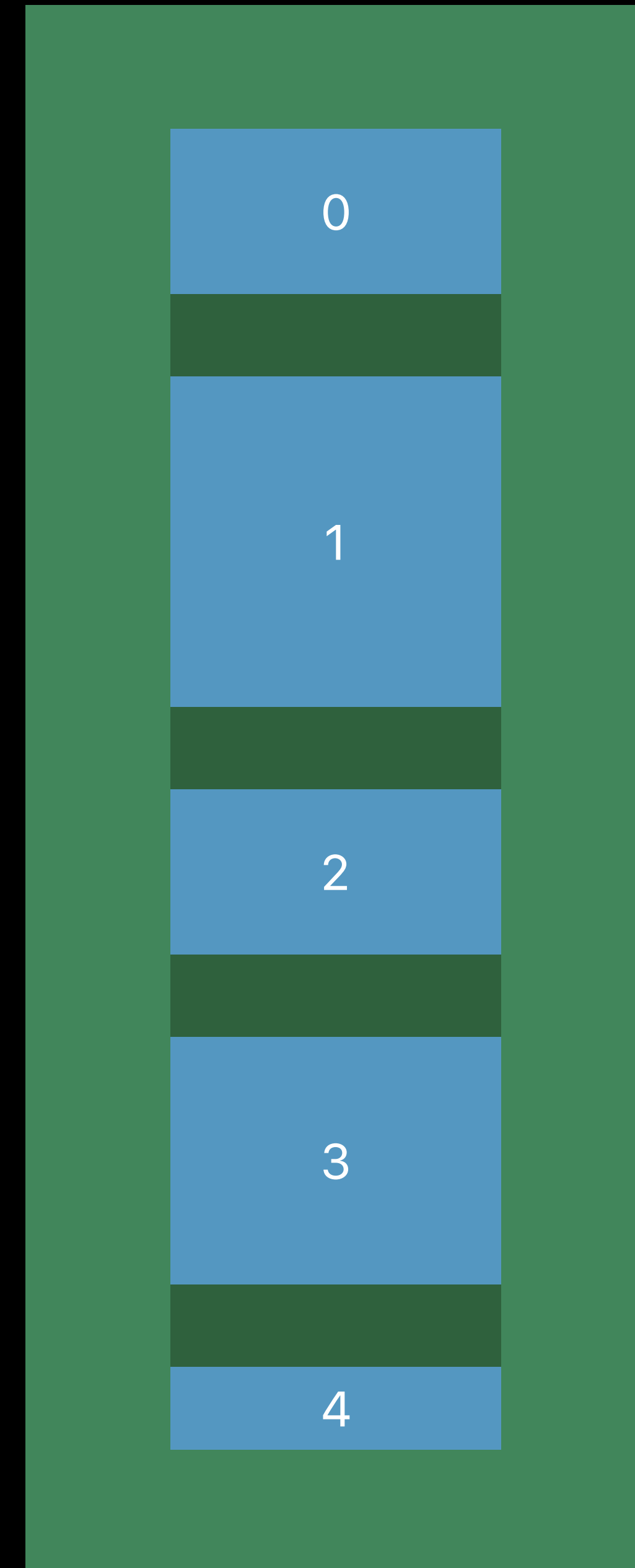
Flows views in a single column or row

Configurable edge insets

Configurable alignment

Optionally fill cross dimension

Your Auto Layout constraints set heights



# NSStackView

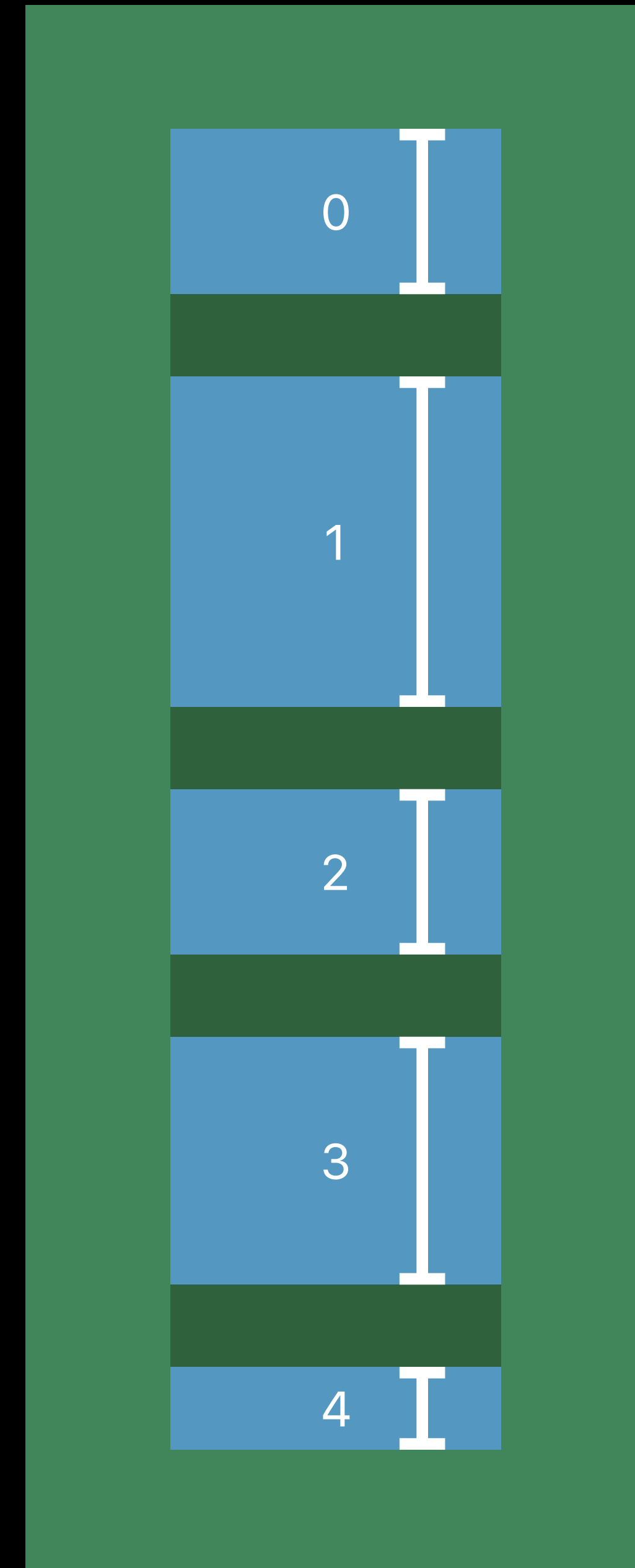
Flows views in a single column or row

Configurable edge insets

Configurable alignment

Optionally fill cross dimension

Your Auto Layout constraints set heights





# NSStackView

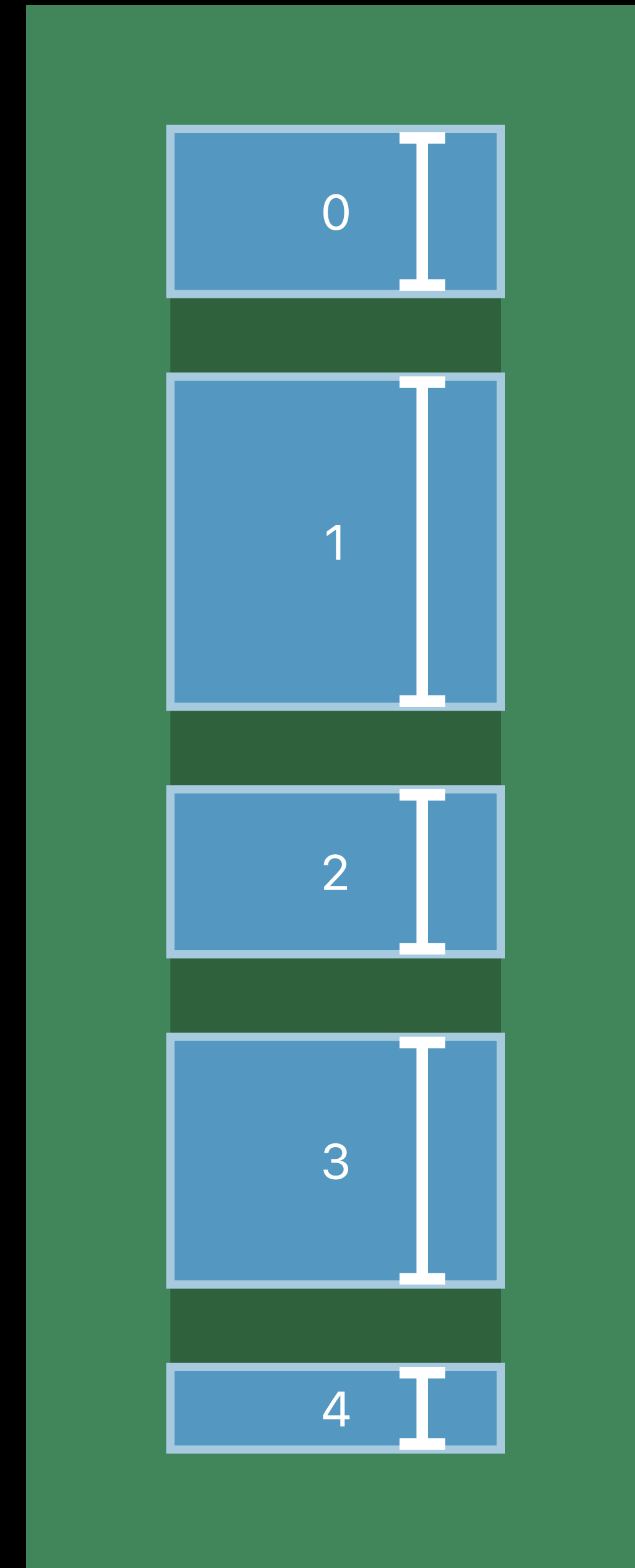
Flows views in a single column or row

Configurable edge insets

Configurable alignment

Optionally fill cross dimension

Your Auto Layout constraints set heights



# NSStackView

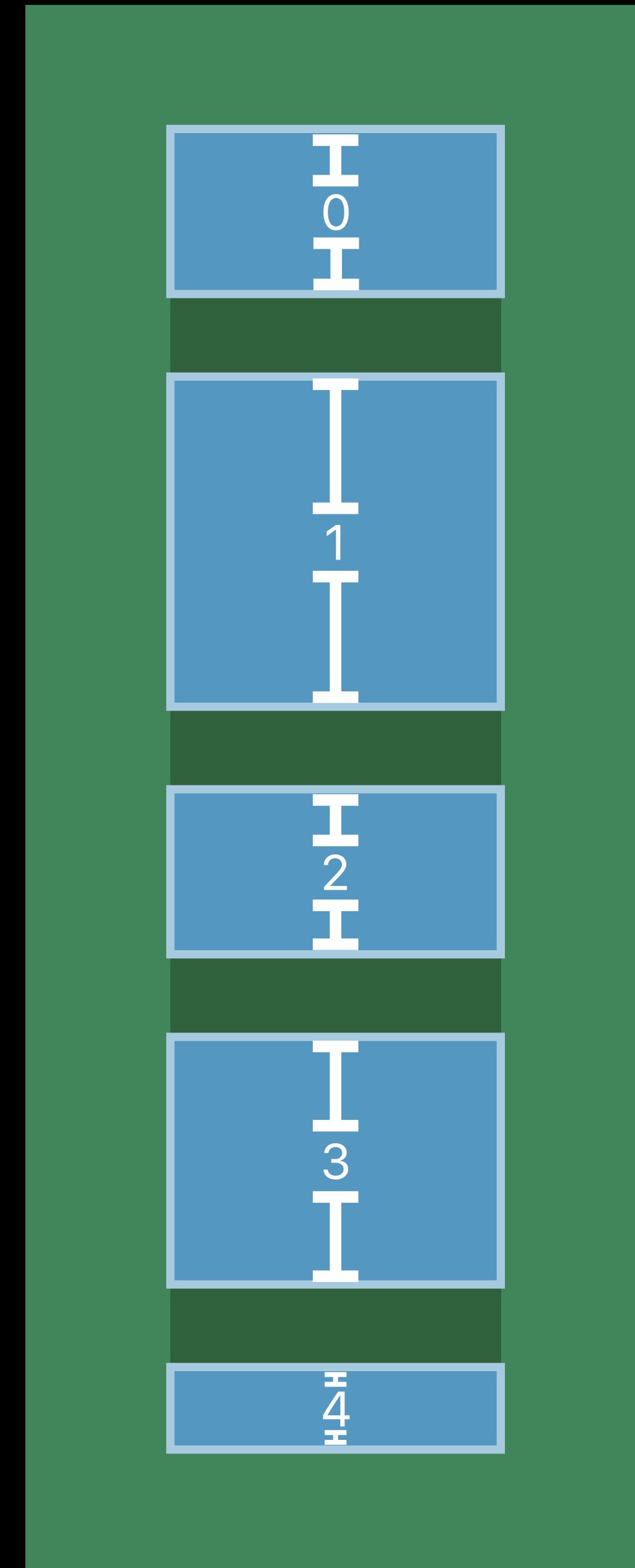
Flows views in a single column or row

Configurable edge insets

Configurable alignment

Optionally fill cross dimension

Your Auto Layout constraints set heights



# NSStackView

Flows views in a single column or row

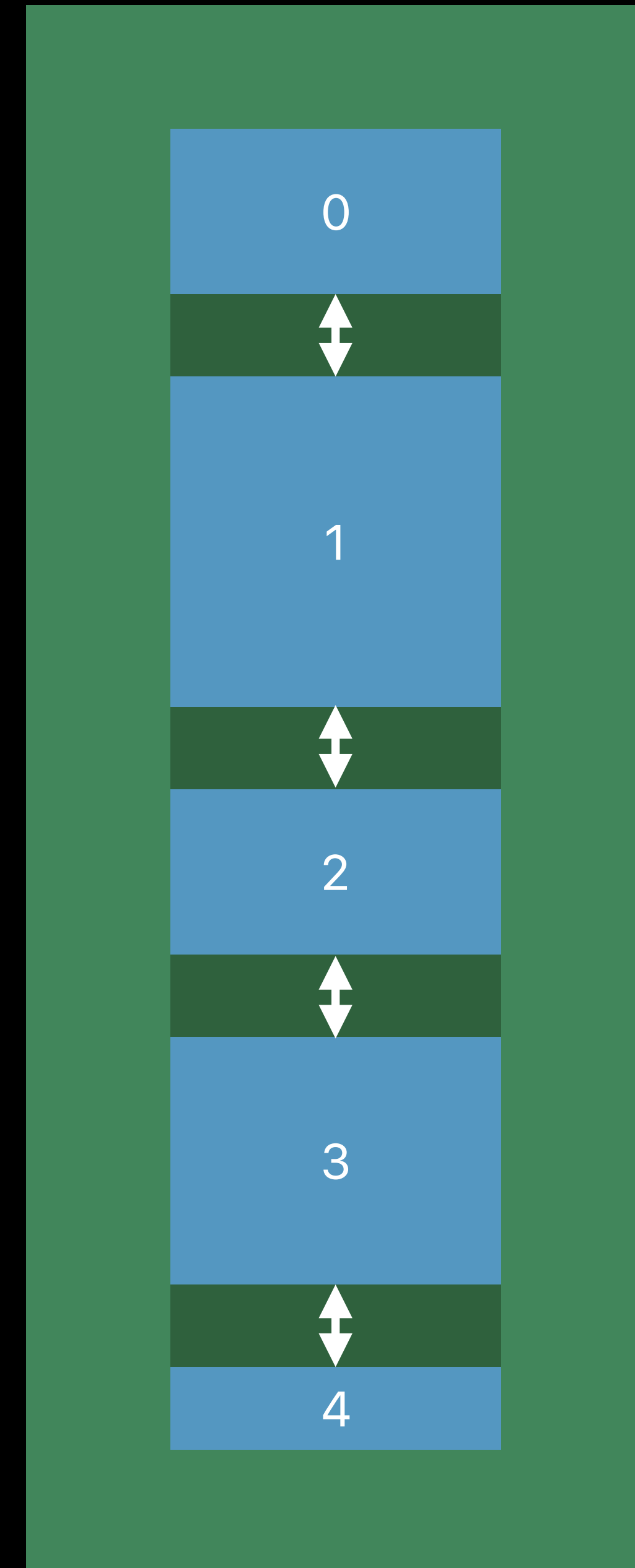
Configurable edge insets

Configurable alignment

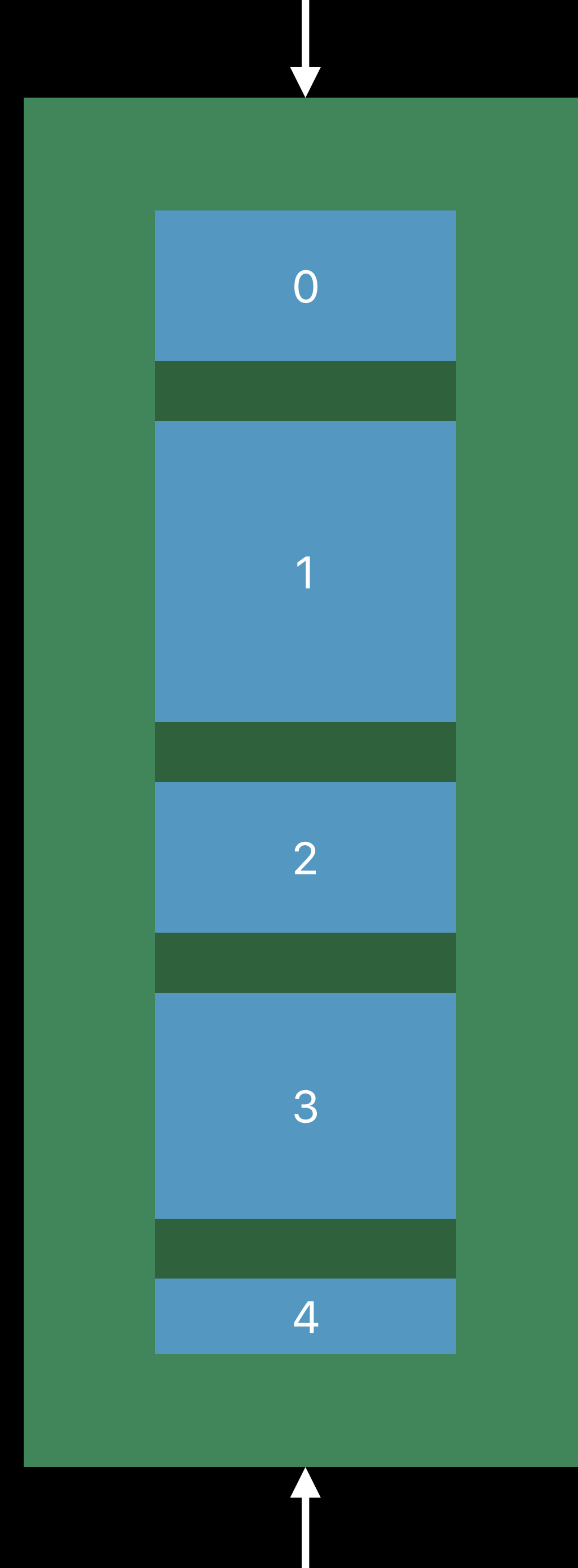
Optionally fill cross dimension

Your Auto Layout constraints set heights

Configurable spacing

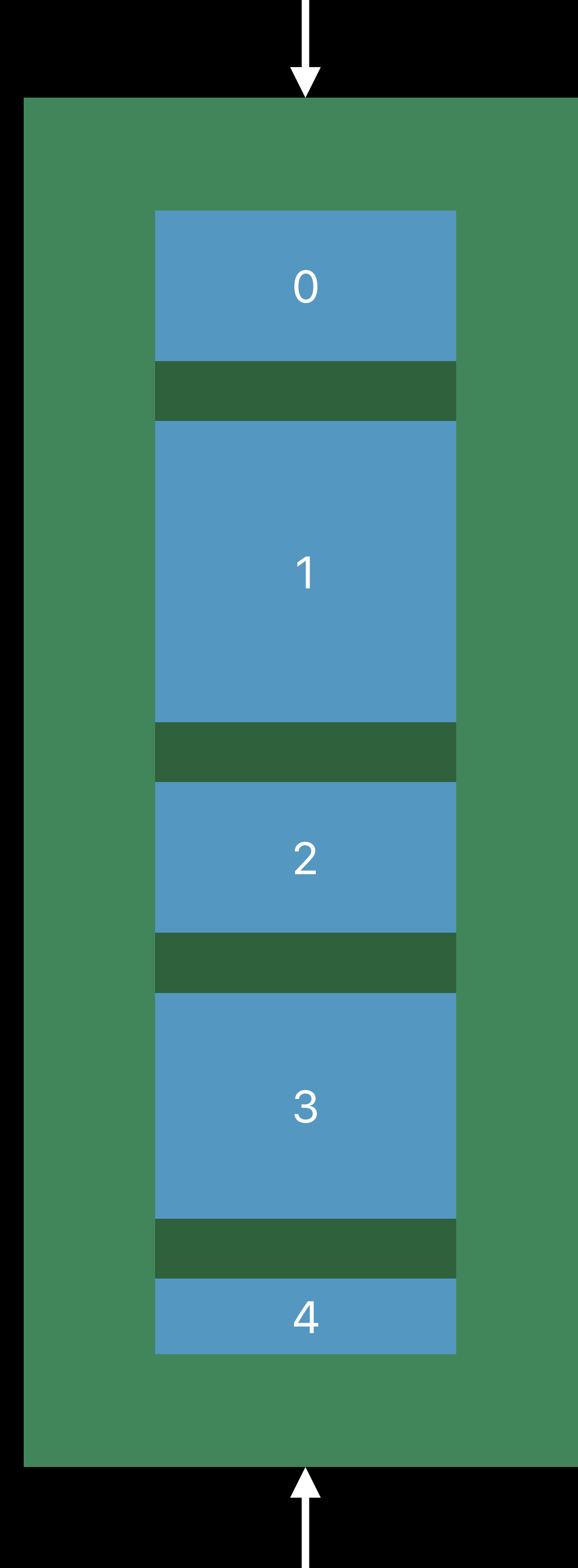


# NSStackView



# NSStackView

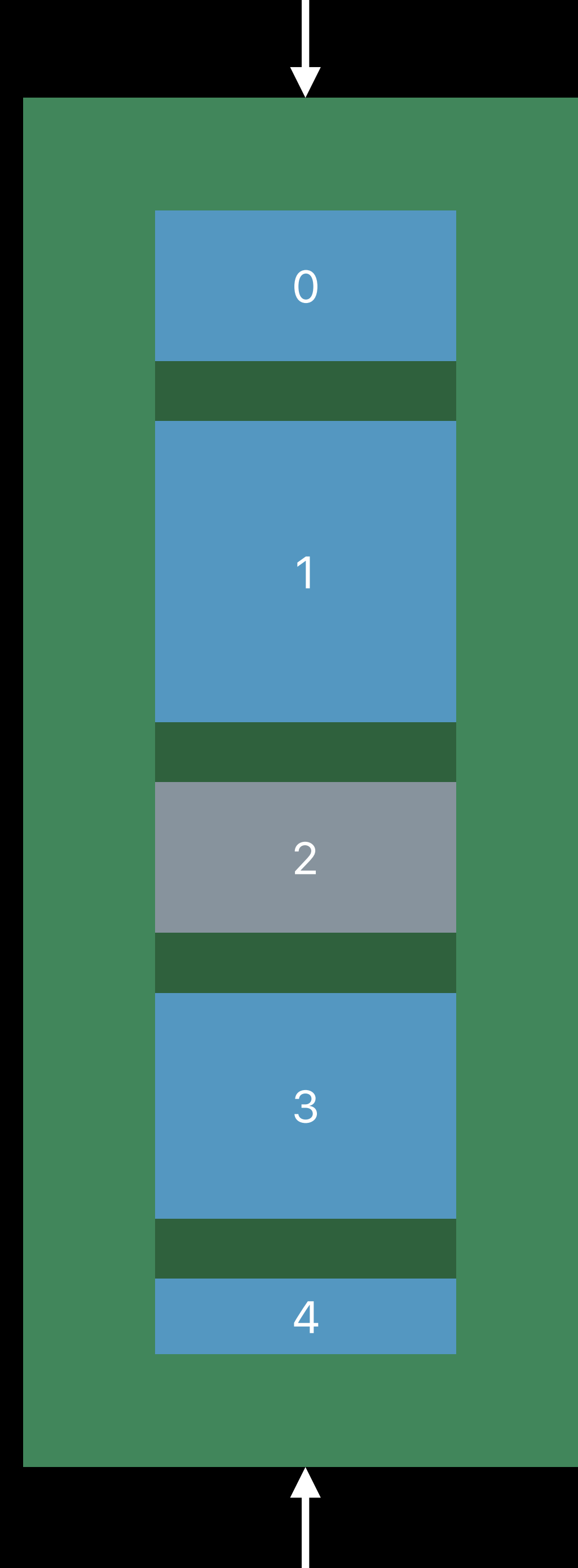
Adapts on resize



# NSStackView

Adapts on resize

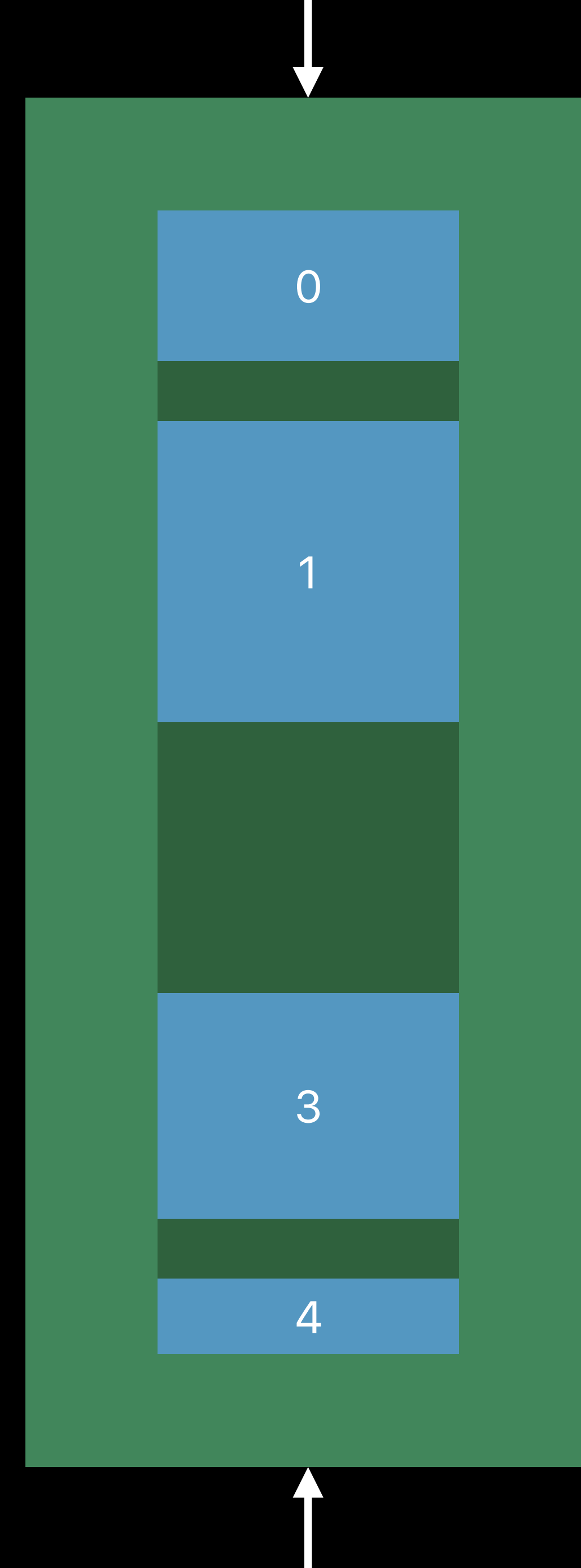
Can automatically drop low-priority views



# NSStackView

Adapts on resize

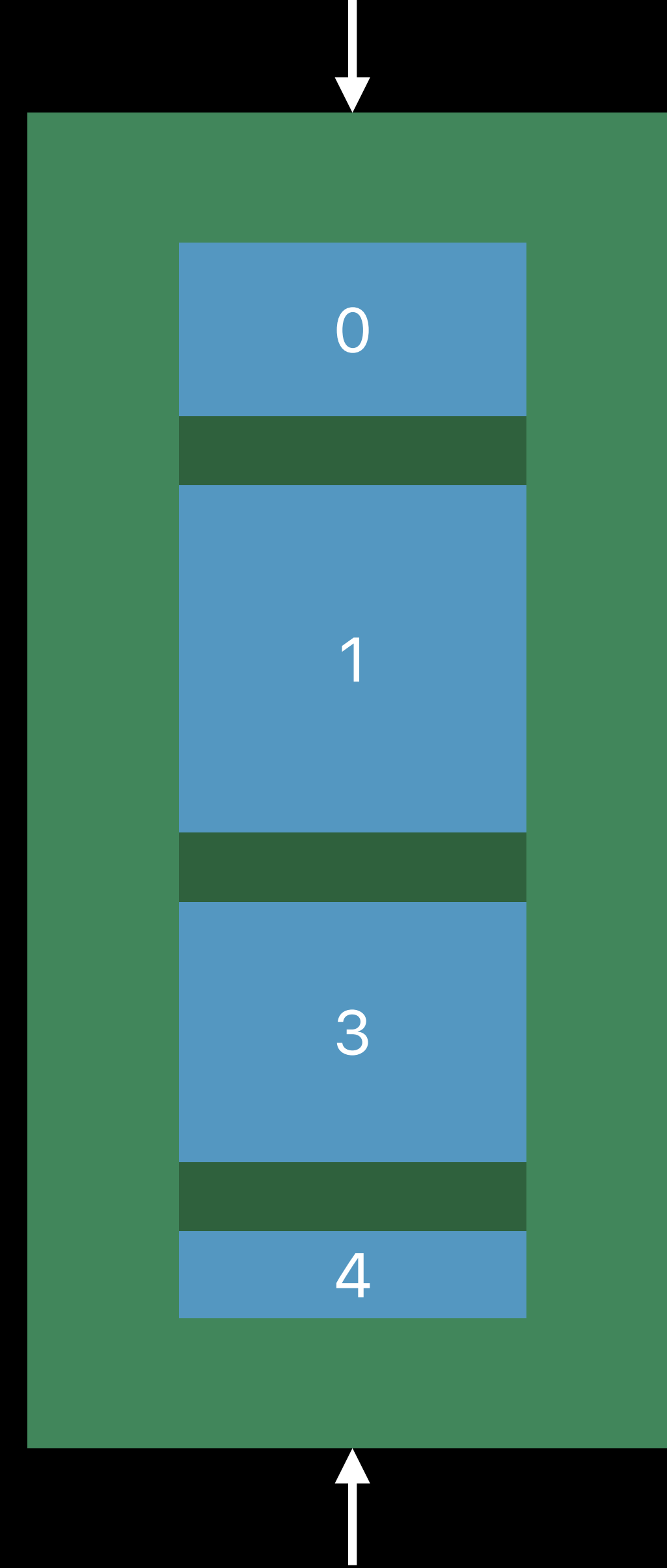
Can automatically drop low-priority views



# NSStackView

Adapts on resize

Can automatically drop low-priority views





# NSStackView

# NSStackView

"Gravity" areas (sections)



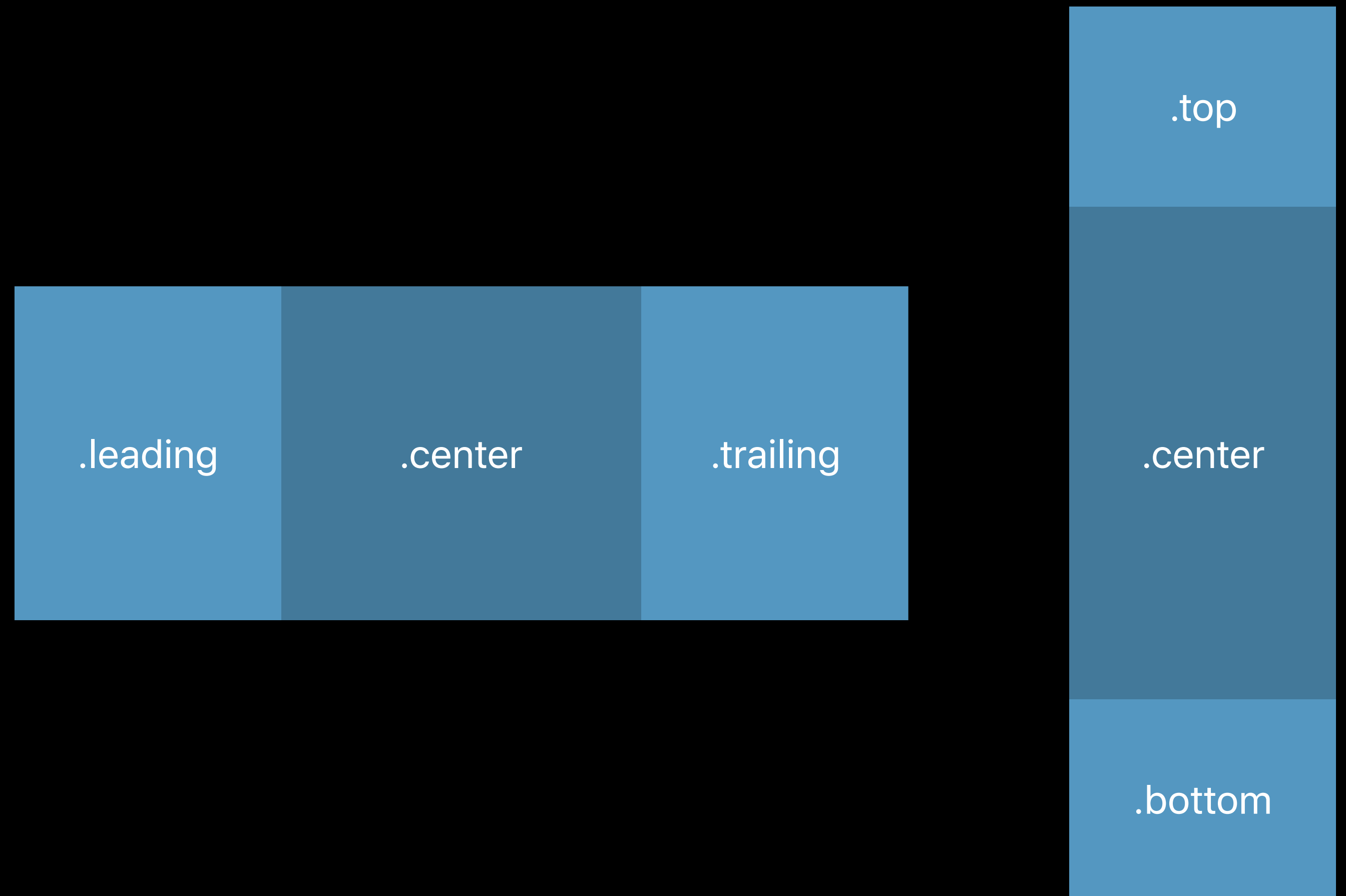
# NSStackView

"Gravity" areas (sections)



# NSStackView

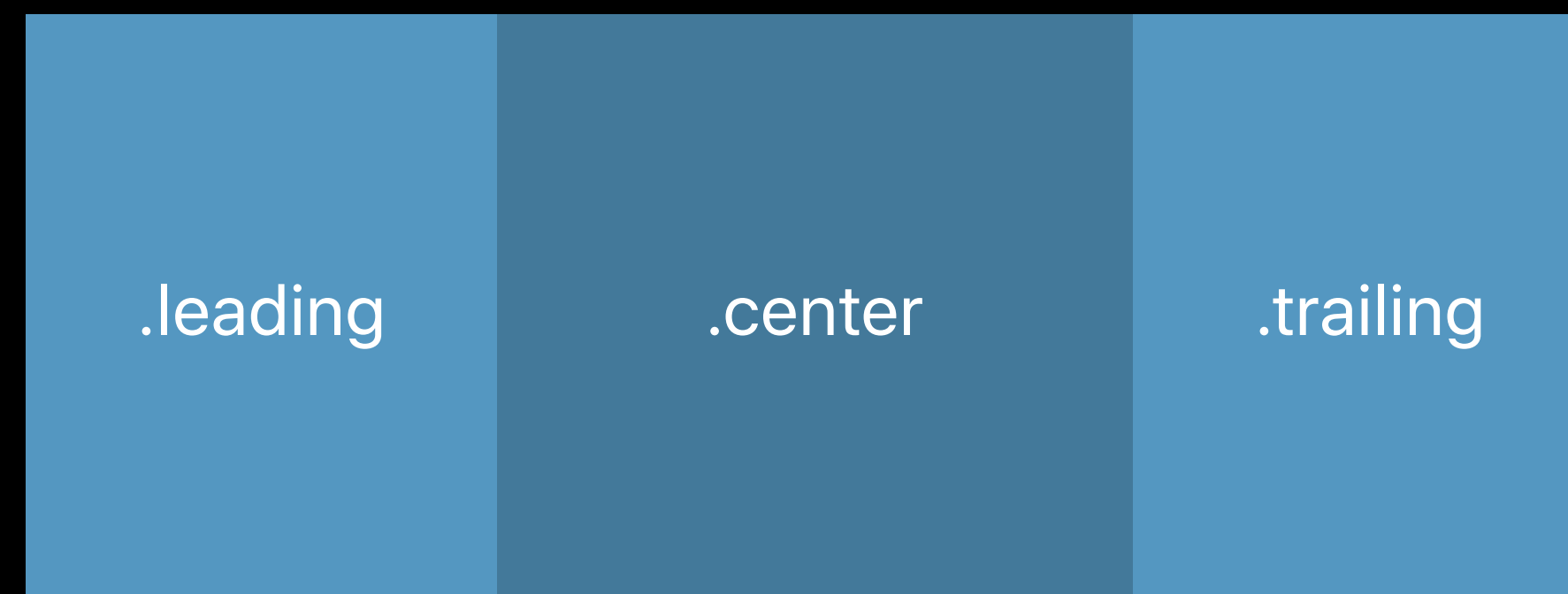
"Gravity" areas (sections)



# NSStackView

"Gravity" areas (sections)

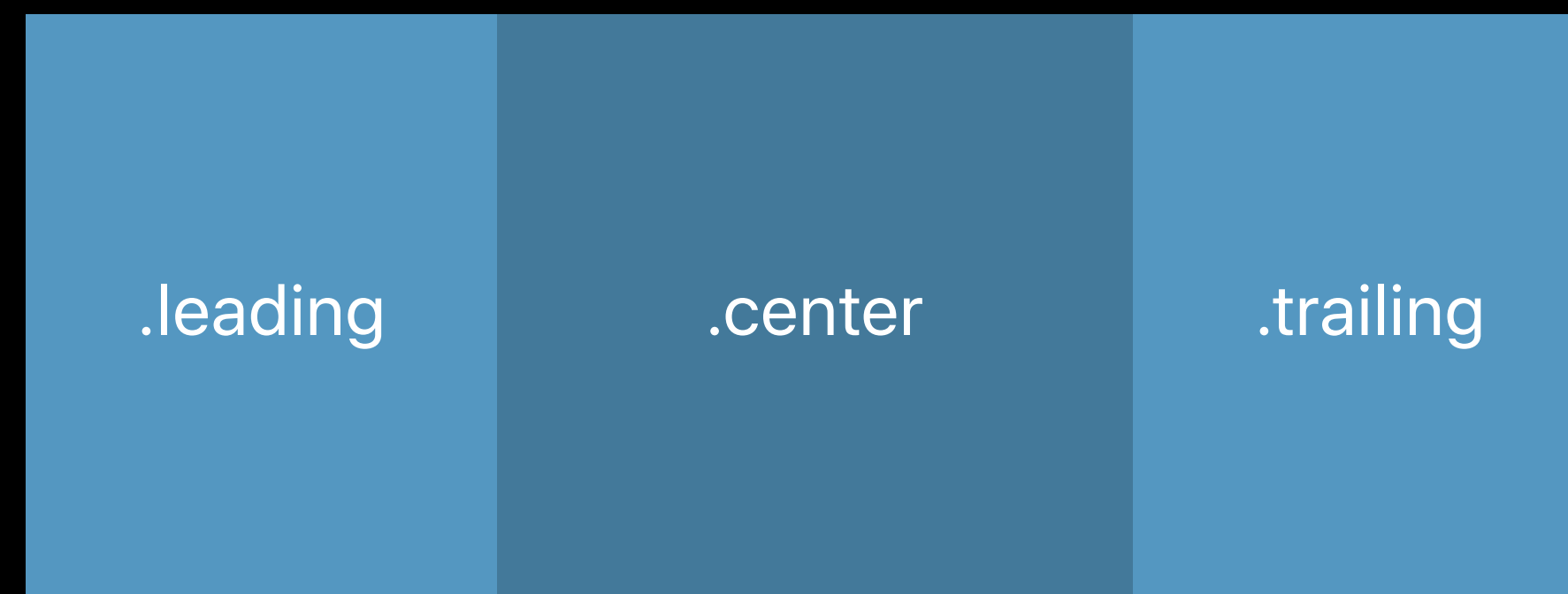
Left-to-Right (LTR)



# NSStackView

"Gravity" areas (sections)

Right-to-Left (RTL)

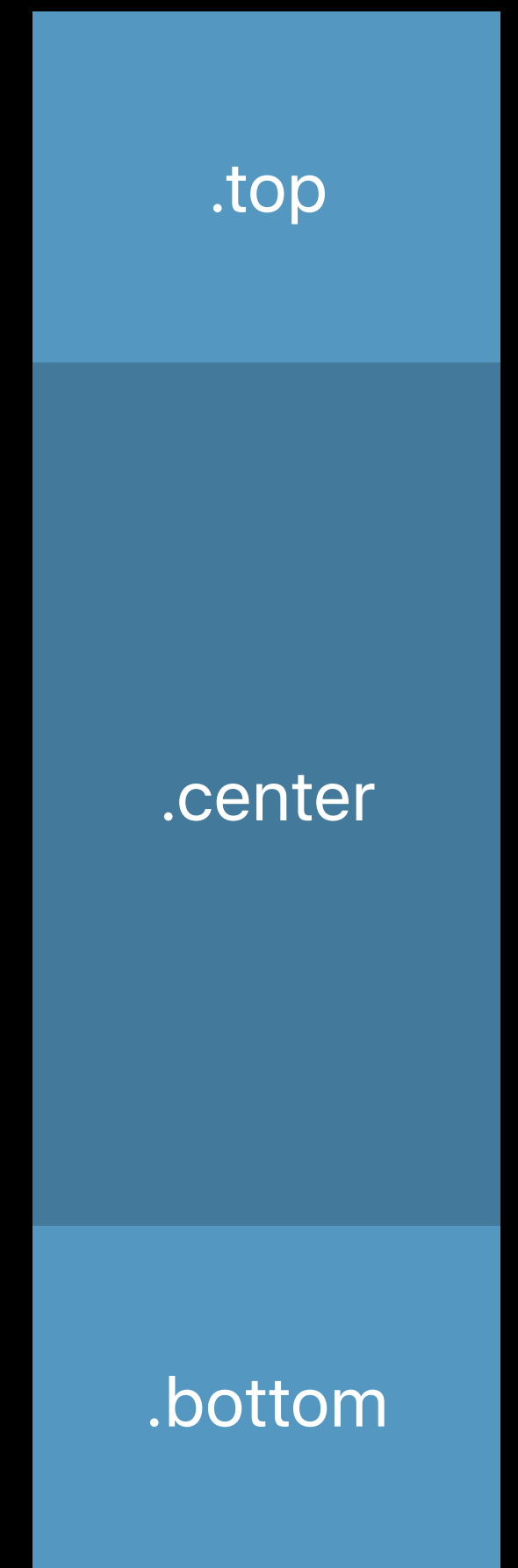
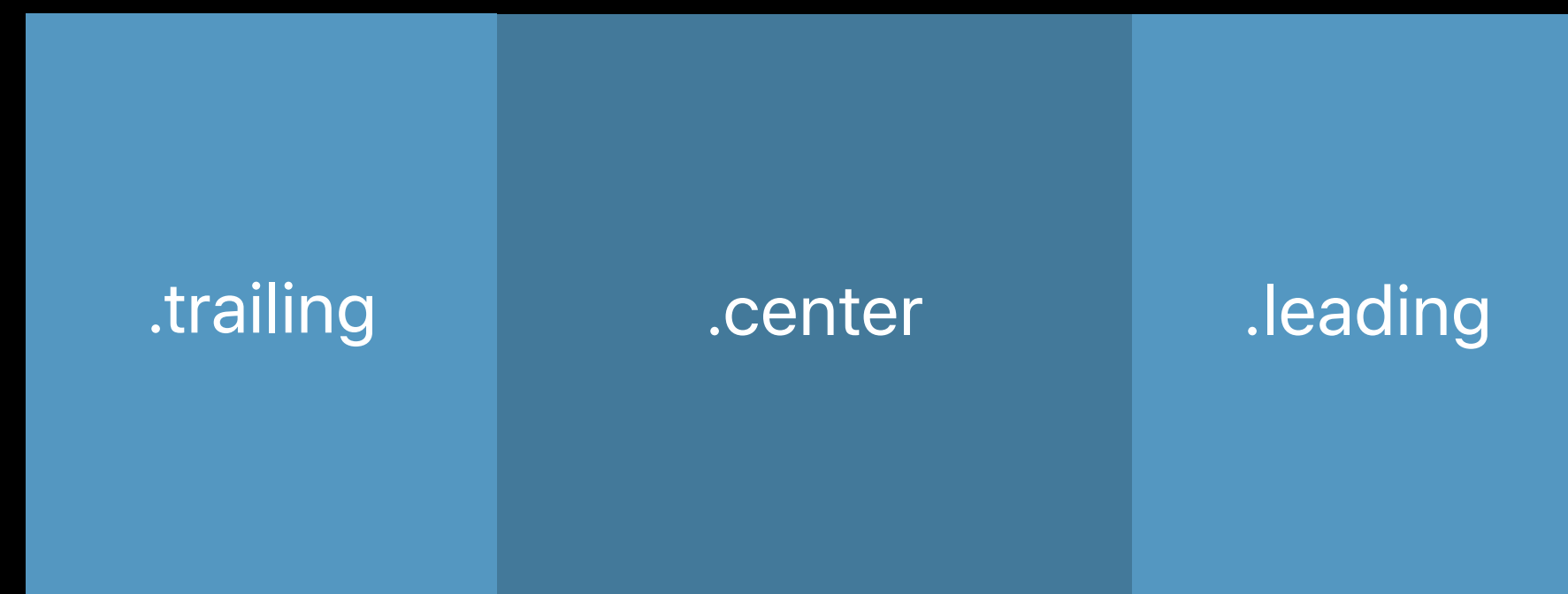


# NSStackView

“Gravity” areas (sections)

Easier UI layout localization

Right-to-Left (RTL)



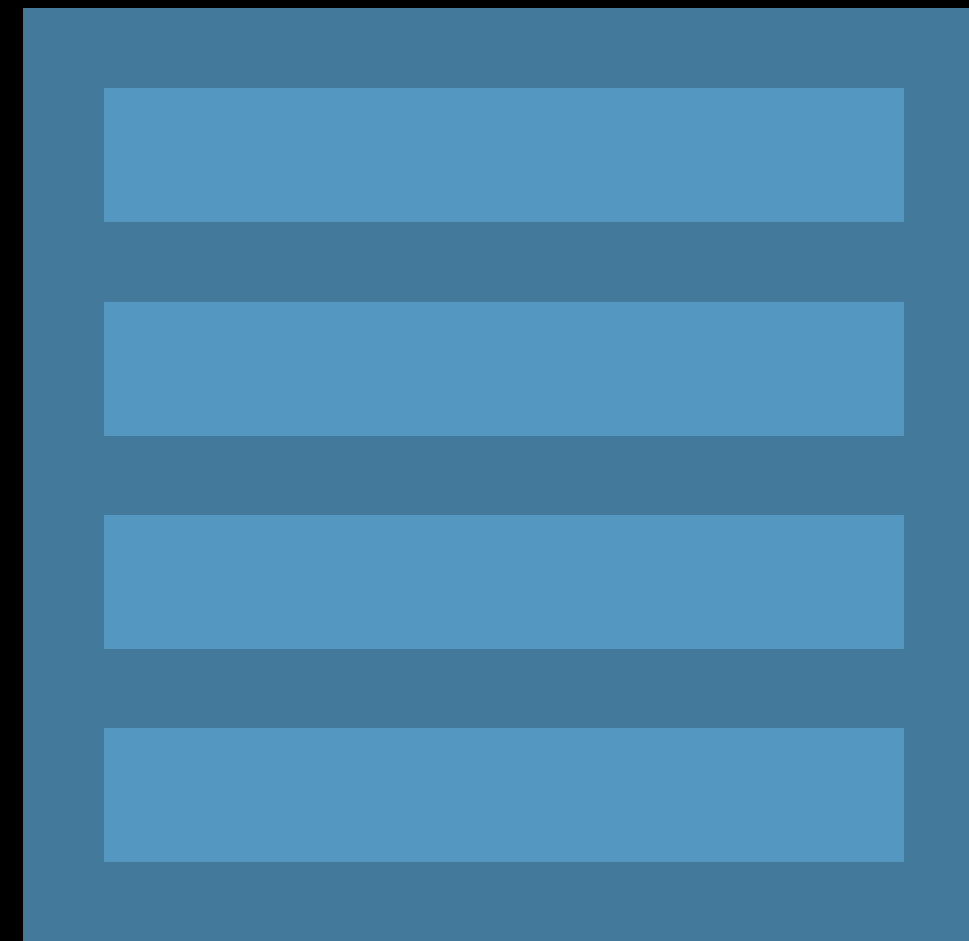
# NSStackView



# NSStackView



# NSStackView



# NSStackView



# NSStackView



# NSStackView



# NSStackView



# NSStackView



# NSStackView



Advanced layouts through composition!



# NSStackView

Learn more

---

Mysteries of Auto Layout, Part 1

WWDC15

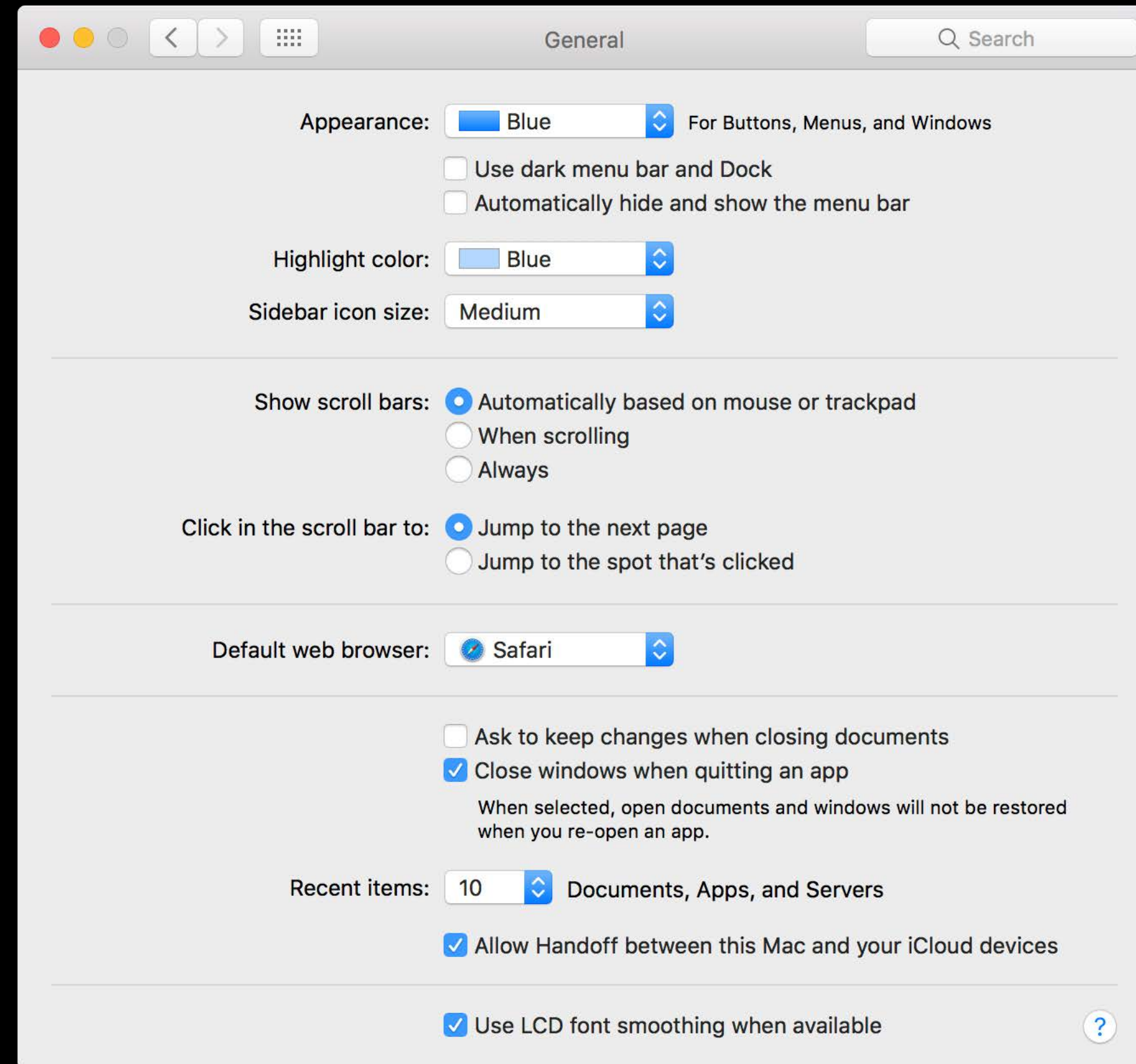
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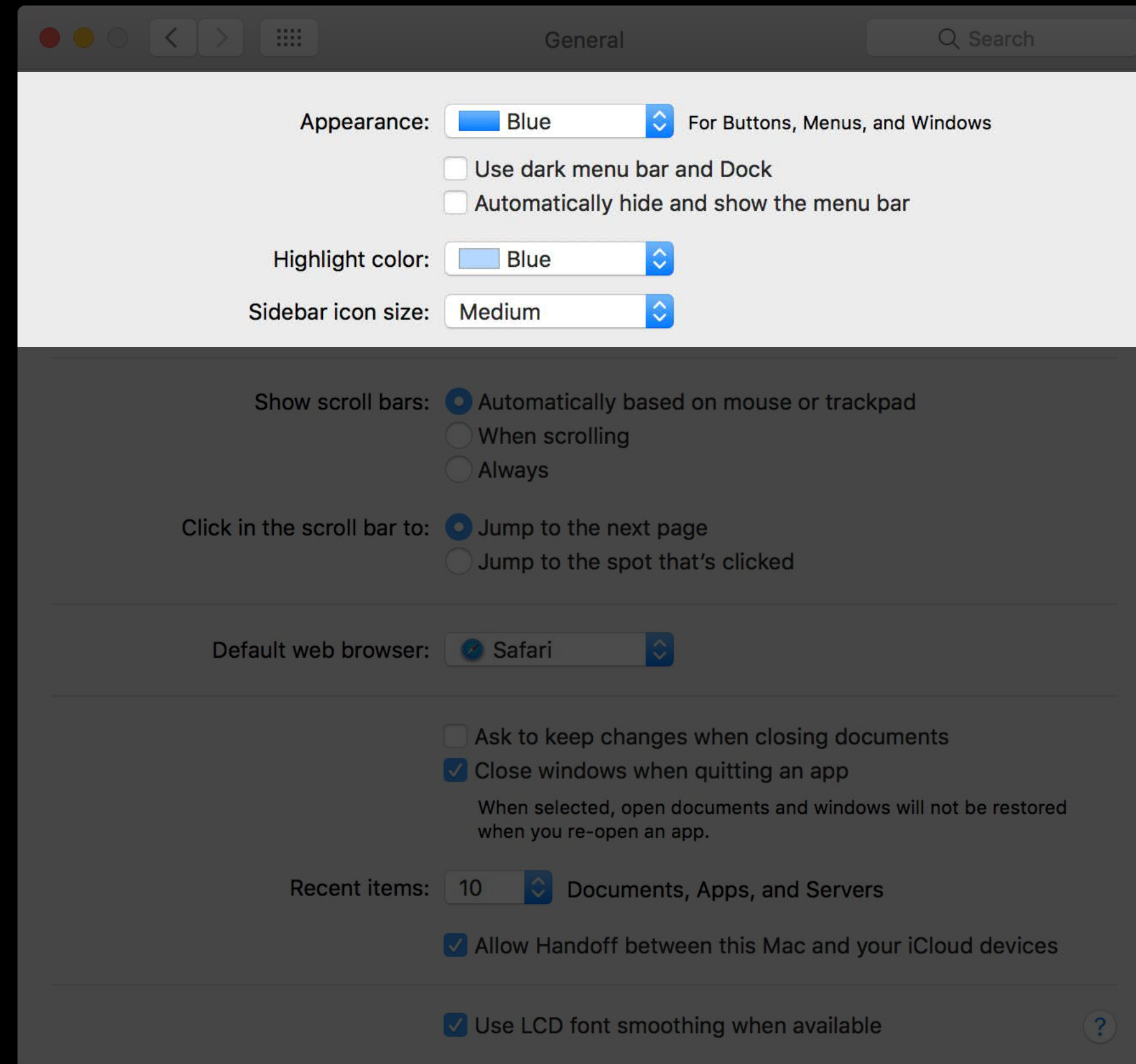
## Guides

- [Auto Layout Cookbook](#)

## Sample Code

- [InfoBarStackView, Exhibition](#)





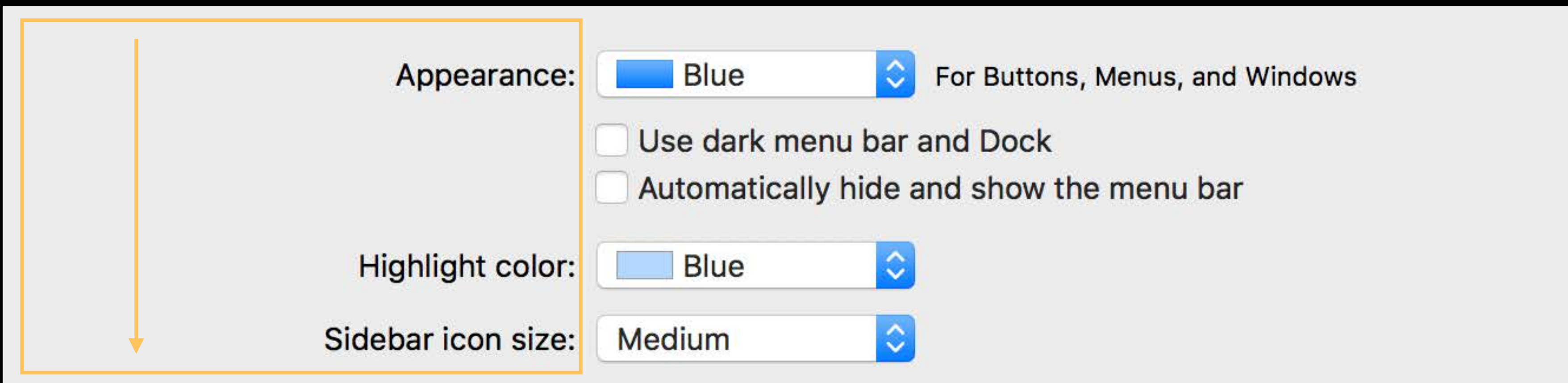
Appearance:  Blue  For Buttons, Menus, and Windows

Use dark menu bar and Dock

Automatically hide and show the menu bar

Highlight color:  Blue 

Sidebar icon size:  Medium 



Appearance: Blue For Buttons, Menus, and Windows

Use dark menu bar and Dock

Automatically hide and show the menu bar

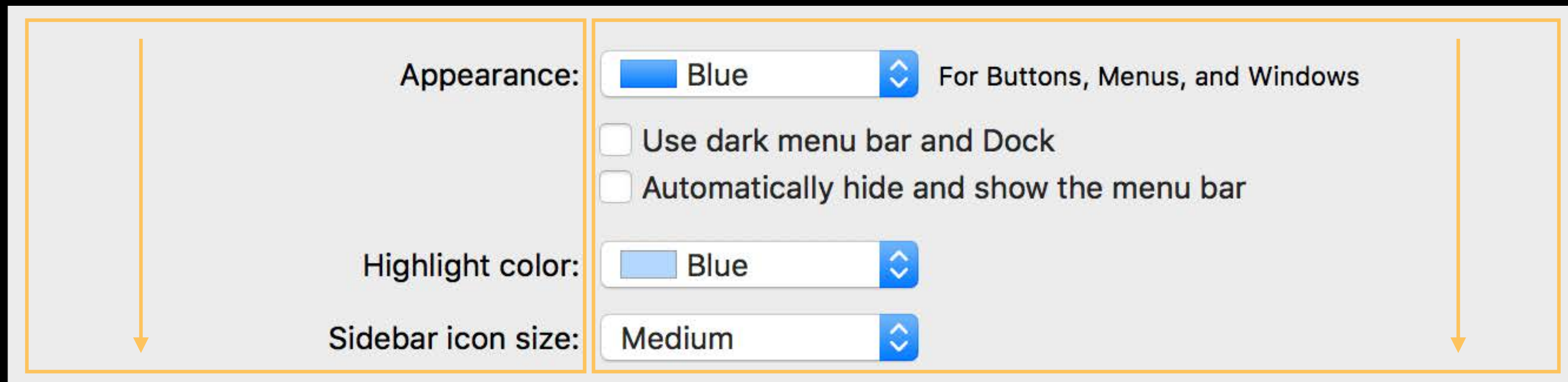
Highlight color: Blue

Sidebar icon size: Medium






The image shows a settings panel with a yellow rectangular box on the left side. A vertical arrow points downwards from the top of this box to the 'Appearance' label. The settings are as follows:

- Appearance:** A dropdown menu is set to 'Blue'. To its right is the text 'For Buttons, Menus, and Windows'.
- Use dark menu bar and Dock:** An unchecked checkbox.
- Automatically hide and show the menu bar:** An unchecked checkbox.
- Highlight color:** A dropdown menu is set to 'Blue'.
- Sidebar icon size:** A dropdown menu is set to 'Medium'.






# NSStackView?








# NSStackView?

Appearance:	 Blue  For Buttons, Menus, and Windows
Highlight color:	<input type="checkbox"/> Use dark menu bar and Dock
Sidebar icon size:	<input type="checkbox"/> Automatically hide and show the menu bar
	 Blue 
	Medium 






# NSStackView?

Appearance:	 Blue  For Buttons, Menus, and Windows
Highlight color:	<input type="checkbox"/> Use dark menu bar and Dock
Sidebar icon size:	<input type="checkbox"/> Automatically hide and show the menu bar
	 Blue 
	Medium 



Appearance:	 Blue  For Buttons, Menus, and Windows
	<input type="checkbox"/> Use dark menu bar and Dock
	<input type="checkbox"/> Automatically hide and show the menu bar
Highlight color:	 Blue 
Sidebar icon size:	Medium 

# NSGridView

Appearance:	 Blue  For Buttons, Menus, and Windows
	<input type="checkbox"/> Use dark menu bar and Dock
	<input type="checkbox"/> Automatically hide and show the menu bar
Highlight color:	 Blue 
Sidebar icon size:	Medium 



# NSGridView

Appearance:  Blue  For Buttons, Menus, and Windows

Use dark menu bar and Dock

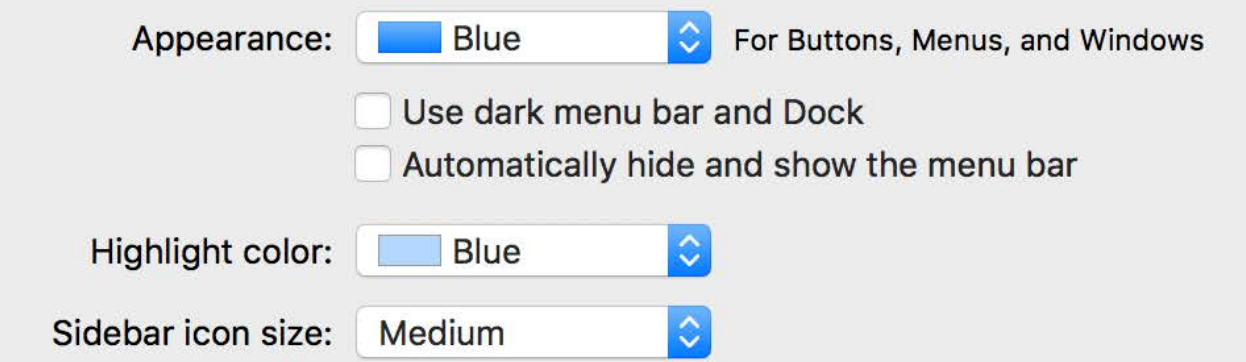
Automatically hide and show the menu bar

Highlight color:  Blue 

Sidebar icon size:  Medium 

# NSGridView

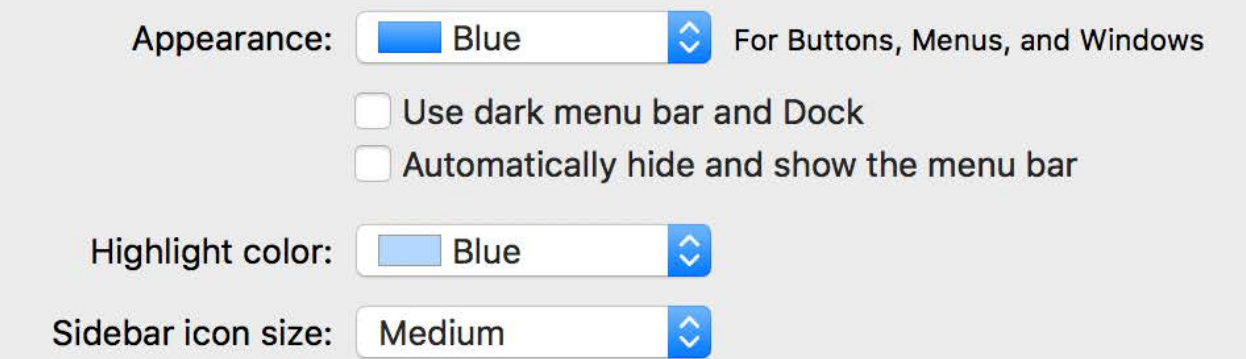
Coordinated rows and columns



# NSGridView

Coordinated rows and columns

Align corresponding views

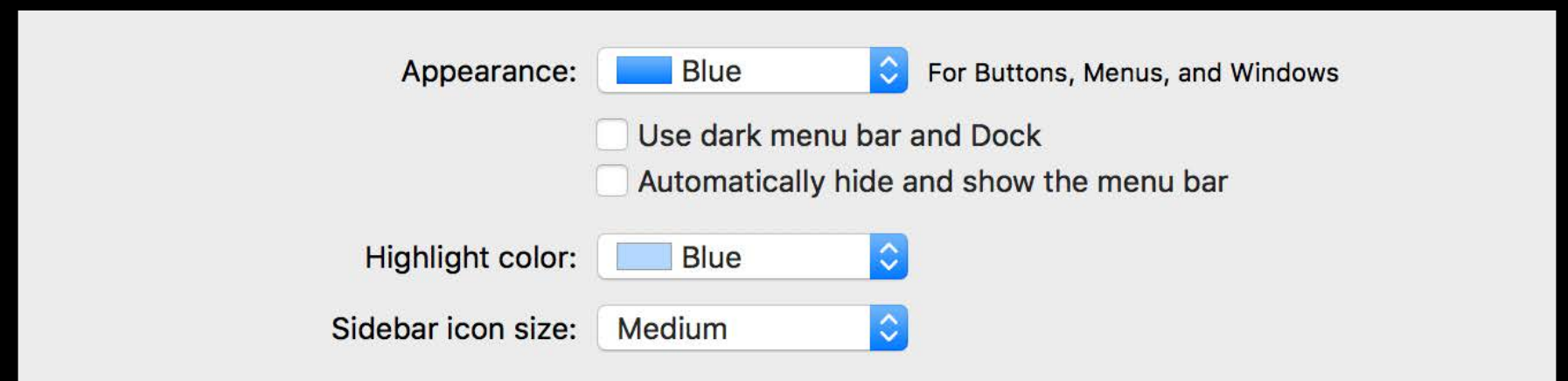


# NSGridView

Coordinated rows and columns

Align corresponding views

Simple control over size, alignment, and spacing

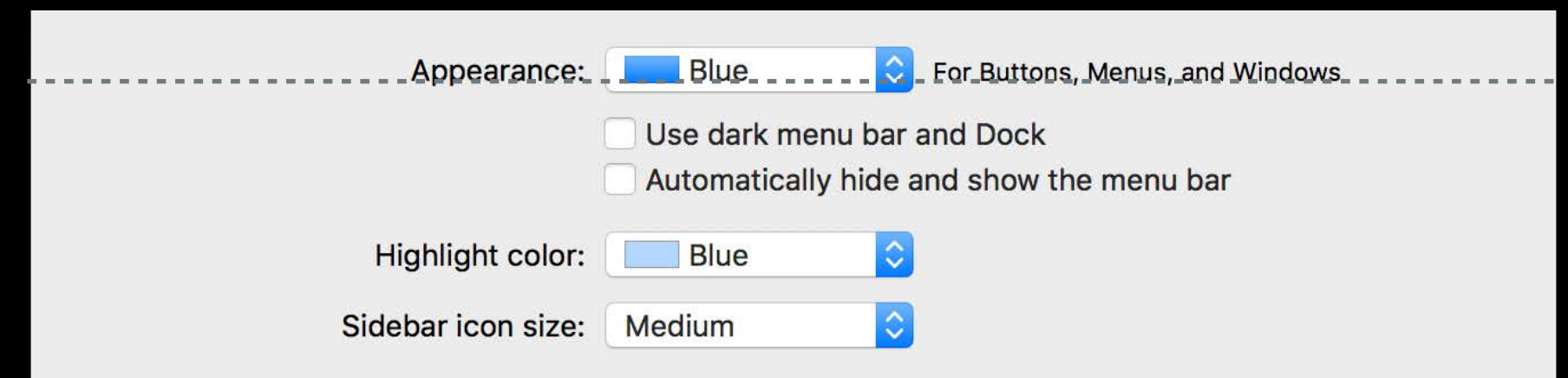


# NSGridView

Coordinated rows and columns

Align corresponding views

Simple control over size, alignment, and spacing



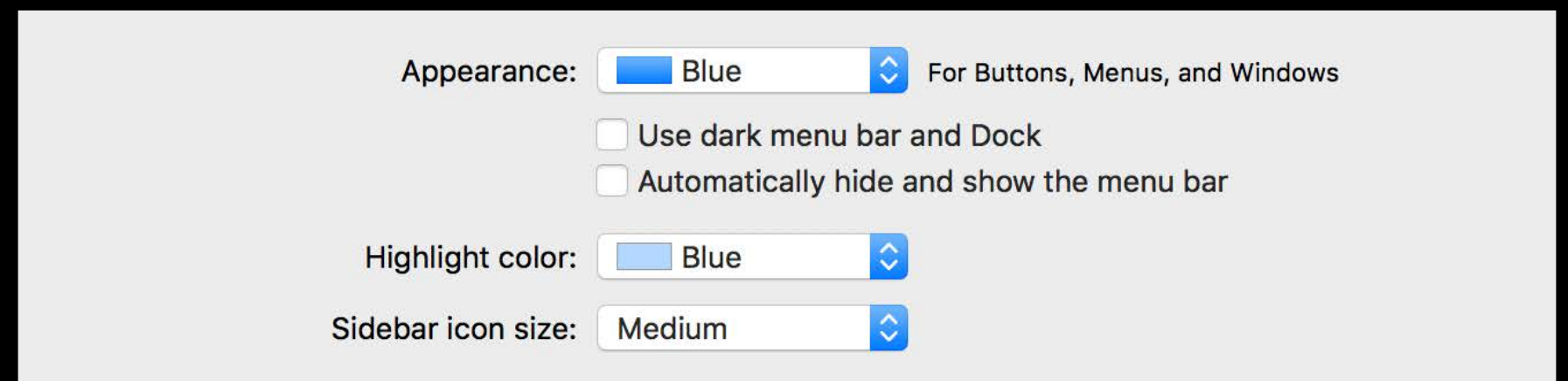
# NSGridView

Coordinated rows and columns

Align corresponding views

Simple control over size, alignment, and spacing

Automatically adapts for right-to-left languages





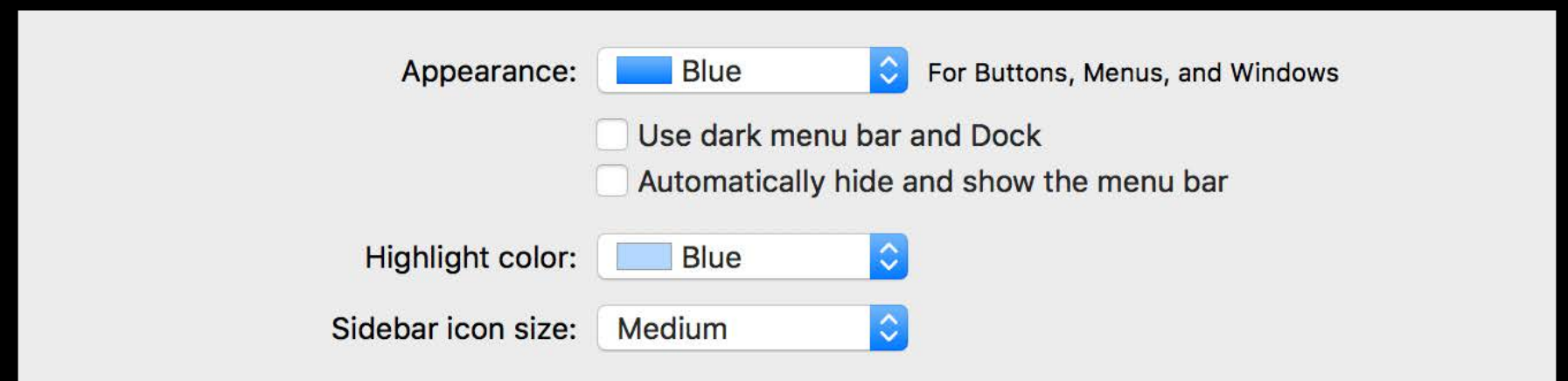
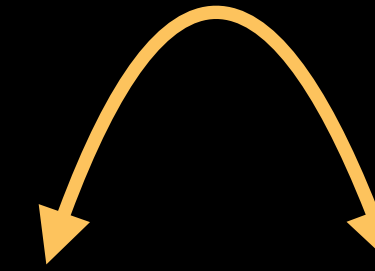
# NSGridView

Coordinated rows and columns

Align corresponding views

Simple control over size, alignment, and spacing

Automatically adapts for right-to-left languages



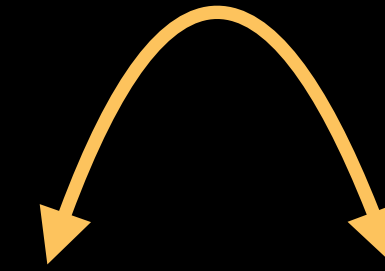
# NSGridView

Coordinated rows and columns

Align corresponding views

Simple control over size, alignment, and spacing

Automatically adapts for right-to-left languages



מראה:  כחול  עבור כפתורים, תפריטים וחלונות

השתמש/י בשורת תפריטים ו-Dock כהים

הסתר והצג את שורת התפריטים באופן אוטומטי

צבע הדגשה:  כחול

גודל צלמית סרגל צד:  בינוני

# NSGridView

Learn more

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What's New in Auto Layout

WWDC16

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# NSGridView and NSStackView

# NSGridView and NSStackView

Great for easy layout and presentation of arrays of views

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But what if we need:

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But what if we need:

- Other kinds of layouts

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- Item selection



# NSGridView and NSStackView

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But what if we need:

- Other kinds of layouts
- Item selection
- Drag and Drop




# NSGridView and NSStackView



Great for easy layout and presentation of arrays of views



But what if we need:


- Other kinds of layouts
- Item selection
- Drag and Drop
- Scalability to unbounded item sets




**What if We Want to  
Build a More Interactive Grid?**

accounts	0.1	3.15	4	0	395	appleseed
 Activity Monitor	1.6	20.96	9	1	921	appleseed
 AirPlayUIAgent	0.0	0.37	4	0	471	appleseed
akd	0.0	0.63	3	0	447	appleseed
 AppleConnectAgent	0.0	1.08	5	0	457	appleseed
AppleIDAuthAgent	0.0	0.35	5	0	467	appleseed
AppleSpell	0.0	2.92	2	0	565	appleseed
askpermissiond	0.0	0.04	2	0	470	appleseed
AssetCacheLocatorService	0.0	0.14	3	0	544	appleseed
assistant_service	0.0	0.80	2	0	541	appleseed
assistantd	0.0	0.87	4	0	453	appleseed
bash	0.0	0.01	1	0	808	appleseed
bird	0.0	4.20	2	0	407	appleseed
CalendarAgent	0.0	1.89	3	0	436	appleseed
CallHistoryPluginHelper	0.0	0.04	2	0	487	appleseed
CallHistorySyncHelper	0.0	0.07	2	0	503	appleseed
callservicesd	0.0	0.45	2	0	391	appleseed
CaINCSservice	0.0	0.67	2	0	443	appleseed
cdpd	0.0	0.03	2	0	558	appleseed
cfprefsd	0.1	1.76	6	0	369	appleseed
cloud	0.1	8.44	18	2	448	appleseed
CloudKeychainProxy	0.0	0.03	2	0	446	appleseed
cloudpaired	0.0	0.46	2	0	472	appleseed




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cloud	0.1	8.44	18	2	448	appleseed
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accounts	0.0	3.15	2	1	395	appleseed
 Activity Monitor	1.5	21.03	9	0	921	appleseed
 AirPlayUIAgent	0.0	0.37	4	0	471	appleseed
akd	0.0	0.63	3	0	447	appleseed
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 Activity Monitor	3.4	21.35	9	4	921	appleseed
 AirPlayUIAgent	0.0	0.38	4	1	471	appleseed
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WiFiProxy	0.0	0.15	2	0	493	appleseed	
 Wi-Fi	0.0	0.34	5	0	475	appleseed	
warmd_agent	0.0	0.02	2	0	598	appleseed	
 ViewBridgeAuxiliary	0.0	0.53	2	0	492	appleseed	
videosubscriptionsd	0.0	0.11	2	0	509	appleseed	
usernoted	0.0	0.84	2	0	427	appleseed	
UserEventAgent	0.0	1.22	3	0	370	appleseed	
useractivityd	0.0	0.54	2	0	449	appleseed	
USBAgent	0.0	0.02	2	0	705	appleseed	
trustd	0.0	6.82	6	0	377	appleseed	
 Touch Bar agent	0.0	0.65	2	0	374	appleseed	
 Terminal	0.0	1.10	7	1	806	appleseed	
tccd	0.0	0.37	2	0	404	appleseed	
 SystemUIServer	0.0	2.23	5	0	397	appleseed	
 System Preferences	0.0	3.90	18	1	390	appleseed	
swcd	0.0	0.05	2	0	923	appleseed	
suggestd	0.0	48.65	2	0	439	appleseed	
storelegacy	0.0	0.05	2	0	547	appleseed	
storedownloadd	0.0	0.09	2	0	417	appleseed	
storeassetd	0.0	0.19	2	0	494	appleseed	
storeaccountd	0.0	0.29	3	0	444	appleseed	
 Spotlight	0.0	1.92	6	0	450	appleseed	
















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Process Name	 % CPU ▾	CPU Time	Threads	Idle	Wake Ups	PID	User
 Activity Monitor	1.4	22.82	7	1	921	appleseed	
 SystemUIServer	0.1	2.24	5	1	397	appleseed	
 Keynote	0.0	1:44.21	7	1	630	appleseed	
SafariCloudHistoryPushAgent	0.0	1.16	4	1	543	appleseed	
 Mail	0.0	1:42.54	10	0	878	appleseed	
nsurlstoraged	0.0	3.19	5	0	426	appleseed	
 Safari Networking	0.0	57.01	8	0	499	appleseed	
 Dock	0.0	3.37	3	0	392	appleseed	
 Finder	0.0	3.06	6	0	398	appleseed	
useractivityd	0.0	0.54	3	0	449	appleseed	
accountsd	0.0	3.16	5	0	395	appleseed	
cfprefsd	0.0	1.79	3	0	369	appleseed	
 com.apple.appkit.xpc.openA...	0.0	2.26	4	1	634	appleseed	
 com.apple.preference.energy...	0.0	0.58	5	0	855	appleseed	
sharingd	0.0	1.56	3	0	451	appleseed	
cloudd	0.0	8.46	6	0	448	appleseed	
 Safari	0.0	2:36.79	9	1	386	appleseed	
 Safari Database Storage	0.0	0.23	4	0	655	appleseed	
 Mail Web Content	0.0	0.40	7	1	885	appleseed	
 LaterAgent	0.0	0.32	4	0	549	appleseed	
 com.apple.dock.extra	0.0	0.50	4	1	452	appleseed	
 com.apple.preference.displa...	0.0	0.24	4	0	857	appleseed	
 AppleConnectAgent	0.0	1.08	6	0	457	appleseed	


















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sharingd	0.0	1.56	3	0	451	appleseed	
cloudd	0.0	8.46	6	0	448	appleseed	
 Safari	0.0	2:36.79	9	1	386	appleseed	
 Safari Database Storage	0.0	0.23	4	0	655	appleseed	
 Mail Web Content	0.0	0.40	7	1	885	appleseed	
 LaterAgent	0.0	0.32	4	0	549	appleseed	
 com.apple.dock.extra	0.0	0.50	4	1	452	appleseed	
 com.apple.preference.displa...	0.0	0.24	4	0	857	appleseed	
 AppleConnectAgent	0.0	1.08	6	0	457	appleseed	

Process Name	% CPU ▾	CPU Time	Threads	Idle	Wake Ups	PID	User
 QuickTime Player	20.0	4.64	13		407	1019	appleseed
 Activity Monitor	6.3	31.47	9		3	921	appleseed
cloudd	1.0	9.52	14		1	448	appleseed
 Control Strip	0.6	3.25	4		0	378	appleseed
nsurlsessiond	0.4	3.11	7		0	433	appleseed
bird	0.3	4.47	6		0	407	appleseed
 Keynote	0.2	1:44.36	7		0	630	appleseed
 Mail	0.2	1:42.85	10		0	878	appleseed
 Finder	0.2	3.21	5		1	398	appleseed
 Safari	0.1	2:42.07	8		1	386	appleseed
 Terminal	0.1	1.12	6		0	806	appleseed
 System Preferences	0.1	3.92	17		0	390	appleseed
 Spotlight	0.1	1.95	5		0	450	appleseed
akd	0.1	0.75	5		0	447	appleseed
accountsd	0.1	3.45	3		0	395	appleseed
 Touch Bar agent	0.1	0.69	2		0	374	appleseed
 Safari Networking	0.1	59.01	7		1	499	appleseed
cfprefsd	0.0	1.88	3		0	369	appleseed
trustd	0.0	7.15	7		0	377	appleseed
 loginwindow	0.0	5.37	2		1	102	appleseed
 AppleConnectAgent	0.0	1.11	6		1	457	appleseed
SafariCloudHistoryPushAgent	0.0	1.21	4		1	543	appleseed
 SystemUIServer	0.0	2.28	5		0	397	appleseed

















Process Name	% CPU ▾	CPU Time	Threads	Idle	Wake Ups	PID	User
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 Activity Monitor	6.3	31.47	9		3	921	appleseed
cloudd	1.0	9.52	14		1	448	appleseed
 Control Strip	0.6	3.25	4		0	378	appleseed
nsurlsessiond	0.4	3.11	7		0	433	appleseed
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# NSTableView

Process Name	% CPU ▾	CPU Time	Threads	Idle	Wake Ups	PID	User
 QuickTime Player	20.0	4.64	13		407	1019	appleseed
 Activity Monitor	6.3	31.47	9		3	921	appleseed
cloudsd	1.0	9.52	14		1	448	appleseed
 Control Strip	0.6	3.25	4		0	378	appleseed
nsurlsessiond	0.4	3.11	7		0	433	appleseed
bird	0.3	4.47	6		0	407	appleseed
 Keynote	0.2	1:44.36	7		0	630	appleseed
 Mail	0.2	1:42.85	10		0	878	appleseed
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 Spotlight	0.1	1.95	5		0	450	appleseed
akd	0.1	0.75	5		0	447	appleseed
accountsd	0.1	3.45	3		0	395	appleseed
 Touch Bar agent	0.1	0.69	2		0	374	appleseed
 Safari Networking	0.1	59.01	7		1	499	appleseed
cfprefsd	0.0	1.88	3		0	369	appleseed
trustd	0.0	7.15	7		0	377	appleseed
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SafariCloudHistoryPushAgent	0.0	1.21	4		1	543	appleseed
 SystemUIServer	0.0	2.28	5		0	397	appleseed

# NSTableView

















Interactive, vertical list view

Process Name	% CPU ▾	CPU Time	Threads
 Activity Monitor	1.4	22.82	7
 SystemUIServer	0.1	2.24	5
 Keynote	0.0	1:44.21	7
SafariCloudHistoryPushAgent	0.0	1.16	4
 Mail	0.0	1:42.54	10
nsurlstoraged	0.0	3.19	5
 Safari Networking	0.0	57.01	8
 Dock	0.0	3.37	3
 Finder	0.0	3.06	6
useractivityd	0.0	0.54	3
accountsd	0.0	3.16	5
cfprefsd	0.0	1.79	3
 com.apple.appkit.xpc.openA...	0.0	2.26	4
 com.apple.preference.energy...	0.0	0.58	5
sharingd	0.0	1.56	3
cloudd	0.0	8.46	6
 Safari	0.0	2:36.79	9
 Safari Database Storage	0.0	0.23	4
 Mail Web Content	0.0	0.40	7
 LaterAgent	0.0	0.32	4
 com.apple.dock.extra	0.0	0.50	4
 com.apple.preference.displa...	0.0	0.24	4
 AppleConnectAgent	0.0	1.08	6

# NSTableView

Interactive, vertical list view

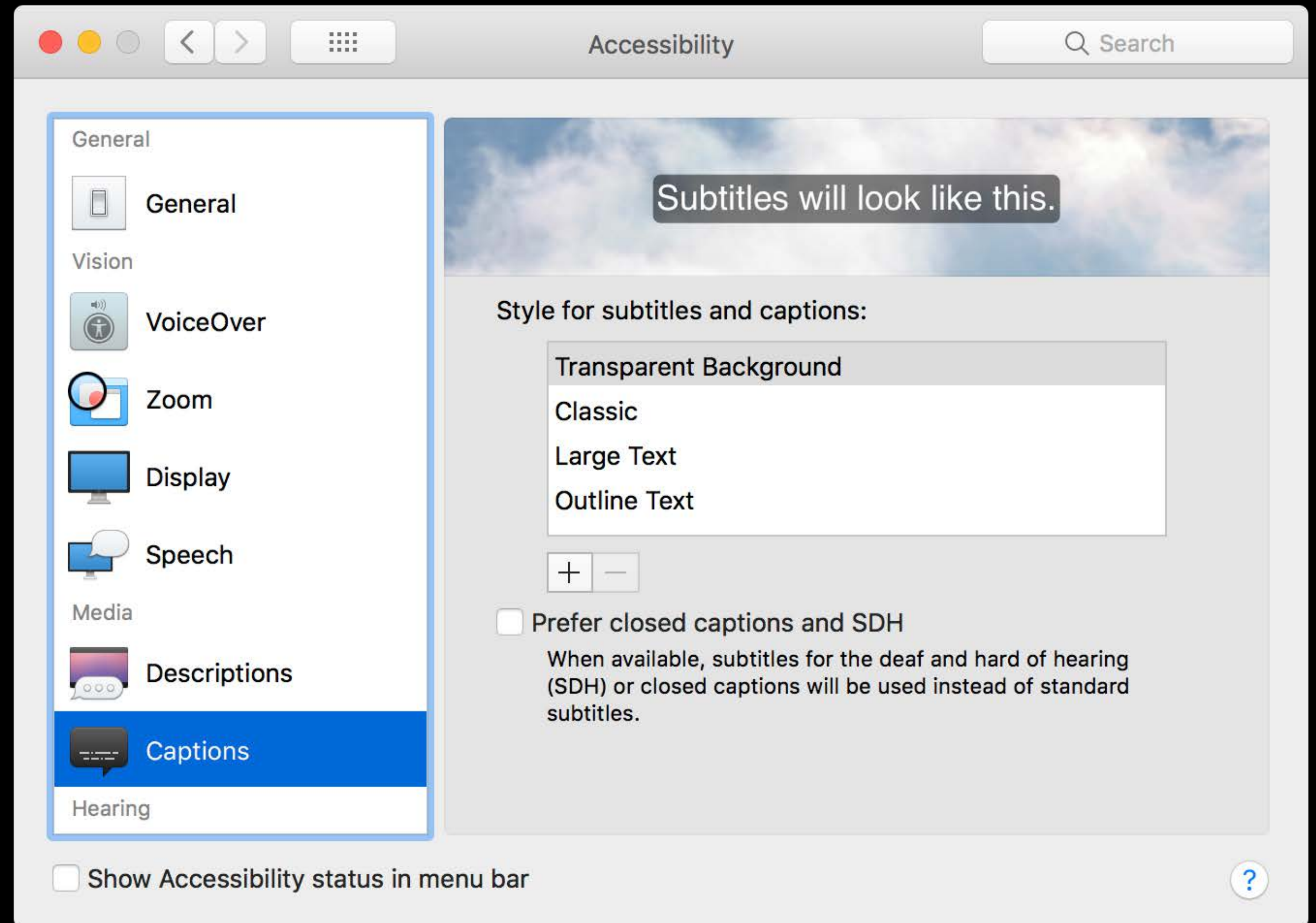
Can be single-column

Process Name	
	Activity Monitor
	SystemUIServer
	Keynote
	SafariCloudHistoryPushAgent
	Mail
	nsurlstoraged
	Safari Networking
	Dock
	Finder
	useractivityd
	accountsd
	cfprefsd
	com.apple.appkit.xpc.openA...
	com.apple.preference.energy...
	sharingd
	cloudd
	Safari
	Safari Database Storage
	Mail Web Content
	LaterAgent
	com.apple.dock.extra
	com.apple.preference.displa...
	AppleConnectAgent

# NSTableView

Interactive, vertical list view

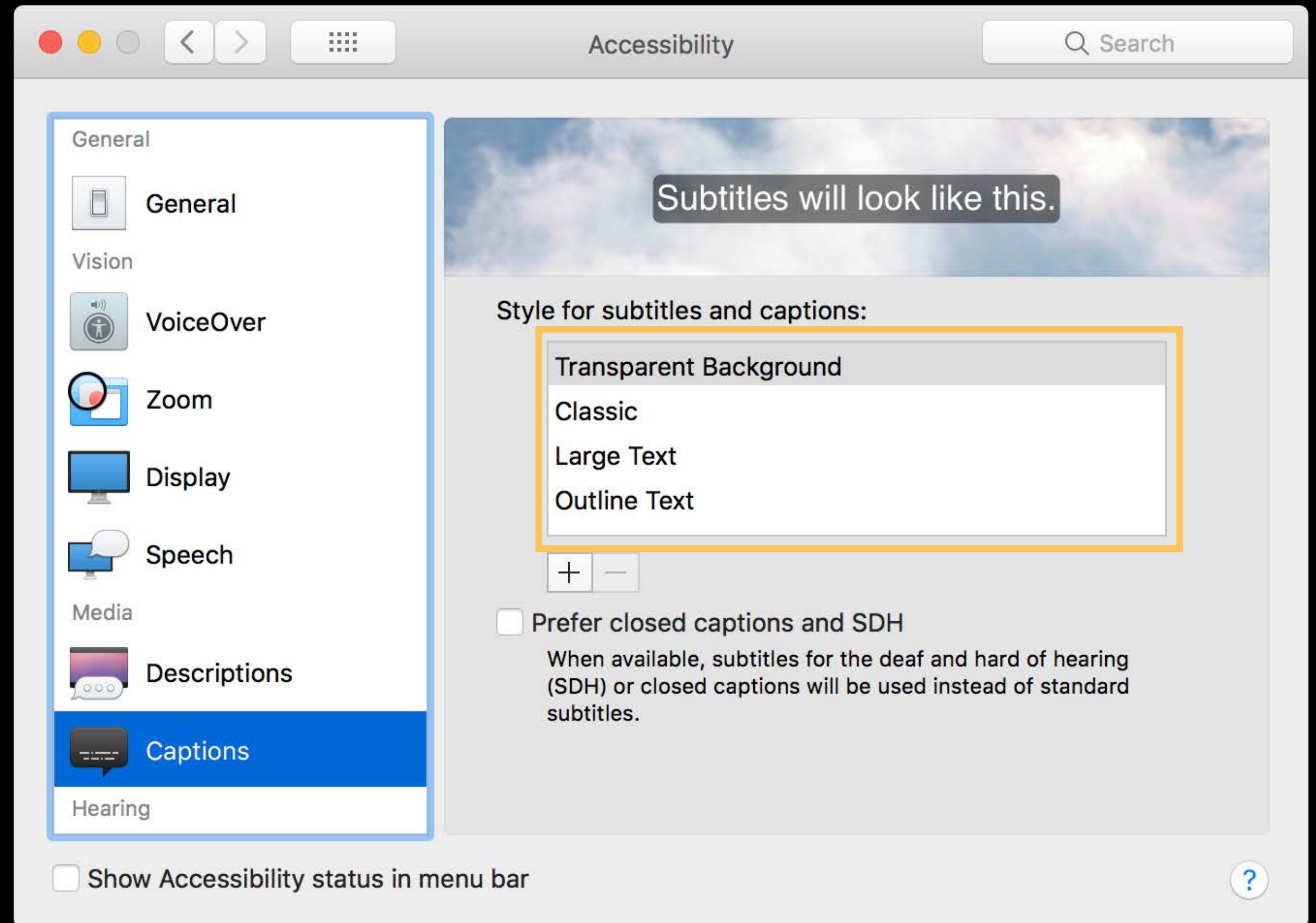
Can be single-column



# NSTableView

Interactive, vertical list view

Can be single-column

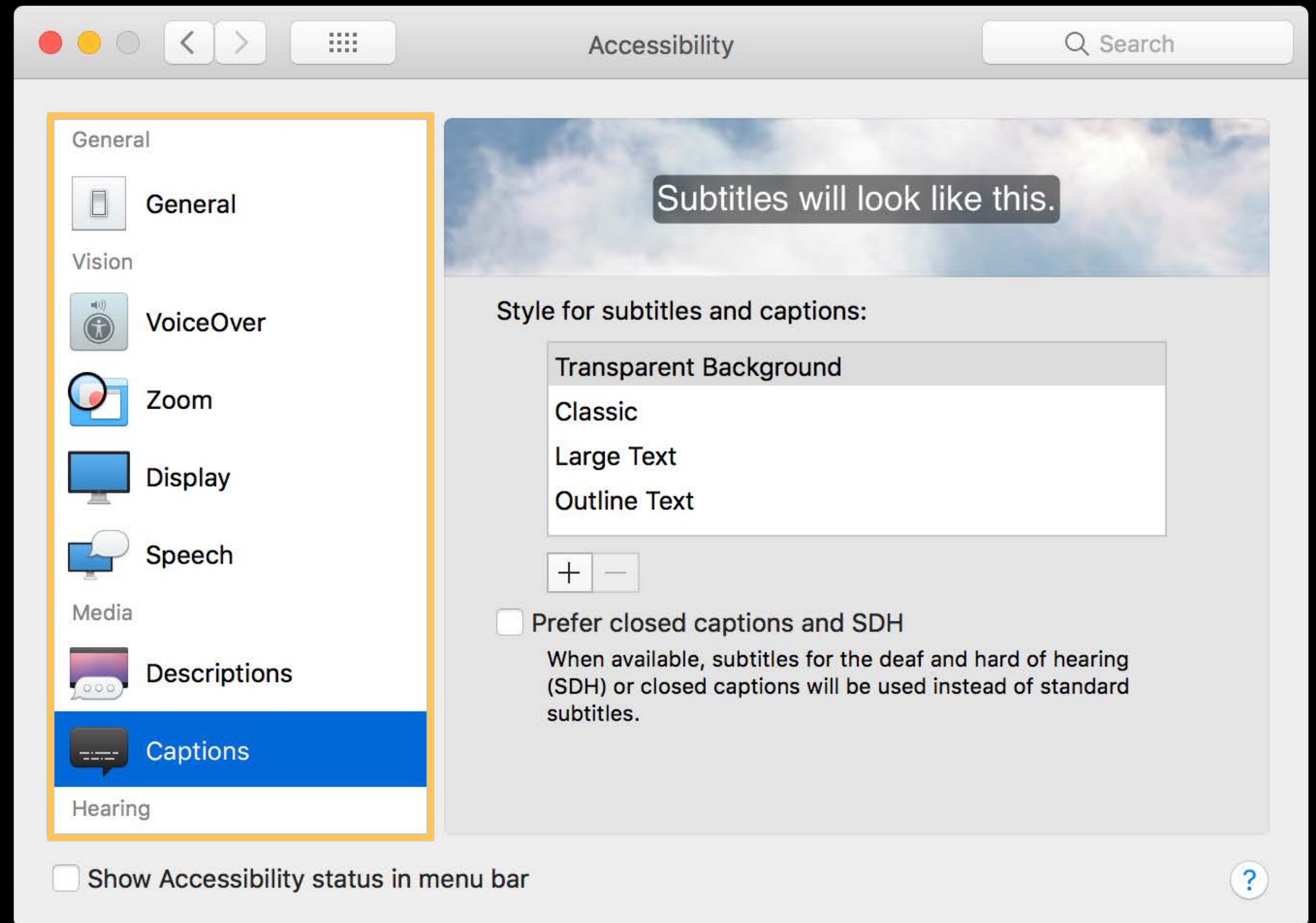




# NSTableView

Interactive, vertical list view

Can be single-column

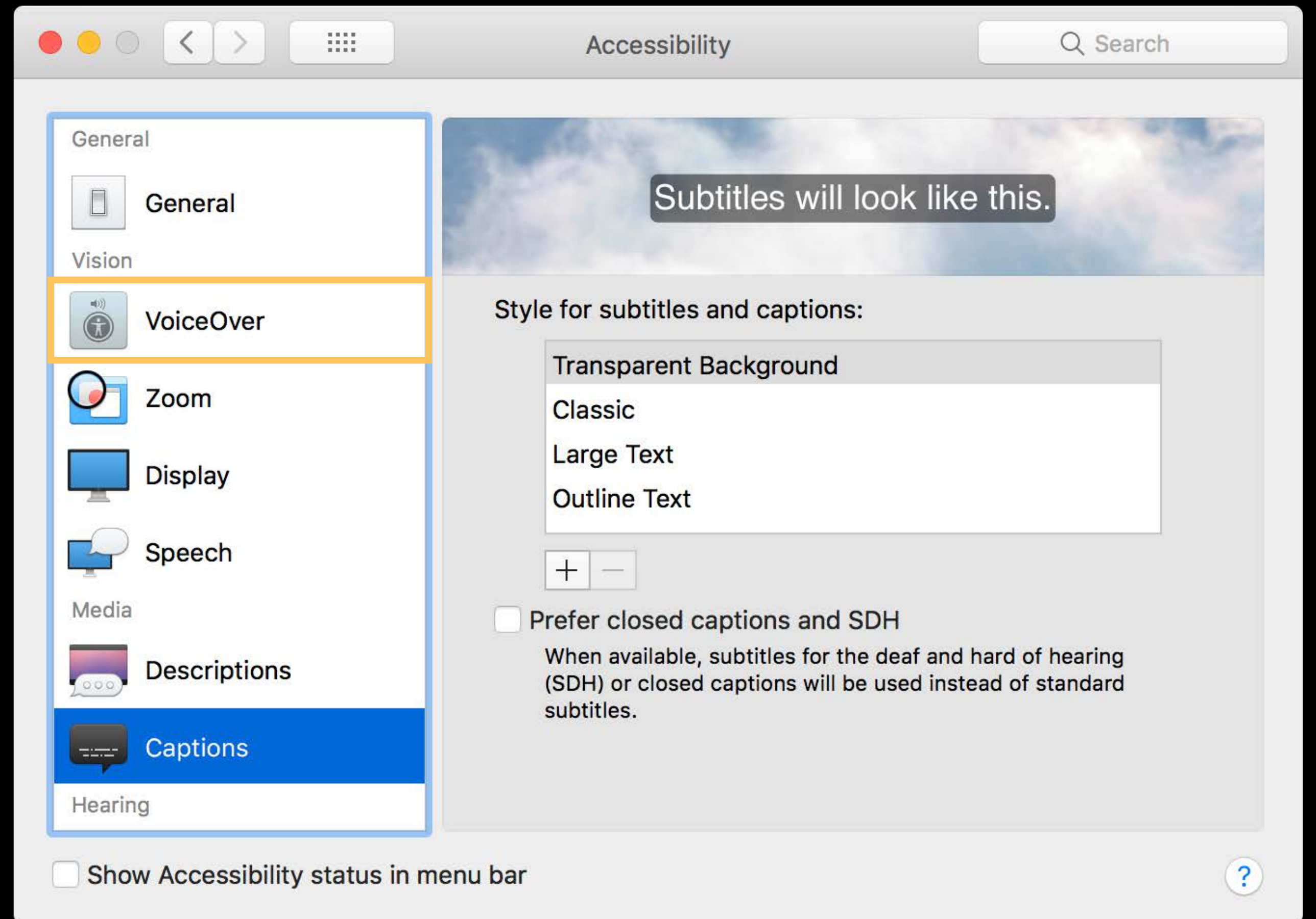


# NSTableView

Interactive, vertical list view

Can be single-column

Arbitrary item content



# NSTableView

Interactive, vertical list view

Can be single-column

Arbitrary item content

Type-selection, keyboard navigation

# NSTableView


















Interactive, vertical list view

Can be single-column

Arbitrary item content

Type-selection, keyboard navigation

Group rows

Images	^	Date Modified	Kind
 family.jpg		Today at 1:40 PM	JPEG image
 kids.jpg		Today at 1:41 PM	JPEG image
 troop42.jpg		Today at 1:41 PM	JPEG image
PDF Documents			
 2017-4037-Form-5498.pdf		Today at 1:35 PM	PDF docume
 HID User Tables.pdf		Today at 1:34 PM	PDF docume
 My Great Novel.pdf		Today at 1:33 PM	PDF docume
 Sales Report.pdf		Today at 1:35 PM	PDF docume
 Sun Palace Manual.pdf		Today at 1:33 PM	PDF docume
Movies			
 Jammin.mov		Today at 1:36 PM	QT movie
Developer			
 HelloWorld.m		Today at 1:37 PM	Objective-C
 HelloWorld.py		Today at 1:37 PM	Python Sourc
 HellowWorld.swift		Today at 1:37 PM	Swift Source
Other			
 Contracts.zip		Today at 1:39 PM	ZIP archive
 Documents.zip		Today at 1:40 PM	ZIP archive
 Installer.dmg		Today at 1:39 PM	Disk Image
 Resources.zip		Today at 1:38 PM	ZIP archive
 Scanned		Today at 1:40 PM	TextEdit

# NSTableView


















Interactive, vertical list view

Can be single-column

Arbitrary item content

Type-selection, keyboard navigation

Group rows

Images	^	Date Modified	Kind
 family.jpg		Today at 1:40 PM	JPEG image
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PDF Documents			
 2017-4037-Form-5498.pdf		Today at 1:35 PM	PDF docume
 HID User Tables.pdf		Today at 1:34 PM	PDF docume
 My Great Novel.pdf		Today at 1:33 PM	PDF docume
 Sales Report.pdf		Today at 1:35 PM	PDF docume
 Sun Palace Manual.pdf		Today at 1:33 PM	PDF docume
Movies			
 Jammin.mov		Today at 1:36 PM	QT movie
Developer			
 HelloWorld.m		Today at 1:37 PM	Objective-C
 HelloWorld.py		Today at 1:37 PM	Python Sourc
 HellowWorld.swift		Today at 1:37 PM	Swift Source
Other			
 Contracts.zip		Today at 1:39 PM	ZIP archive
 Documents.zip		Today at 1:40 PM	ZIP archive
 Installer.dmg		Today at 1:39 PM	Disk Image
 Resources.zip		Today at 1:38 PM	ZIP archive
 Scanned		Today at 1:40 PM	TextEdit

# NSTableView

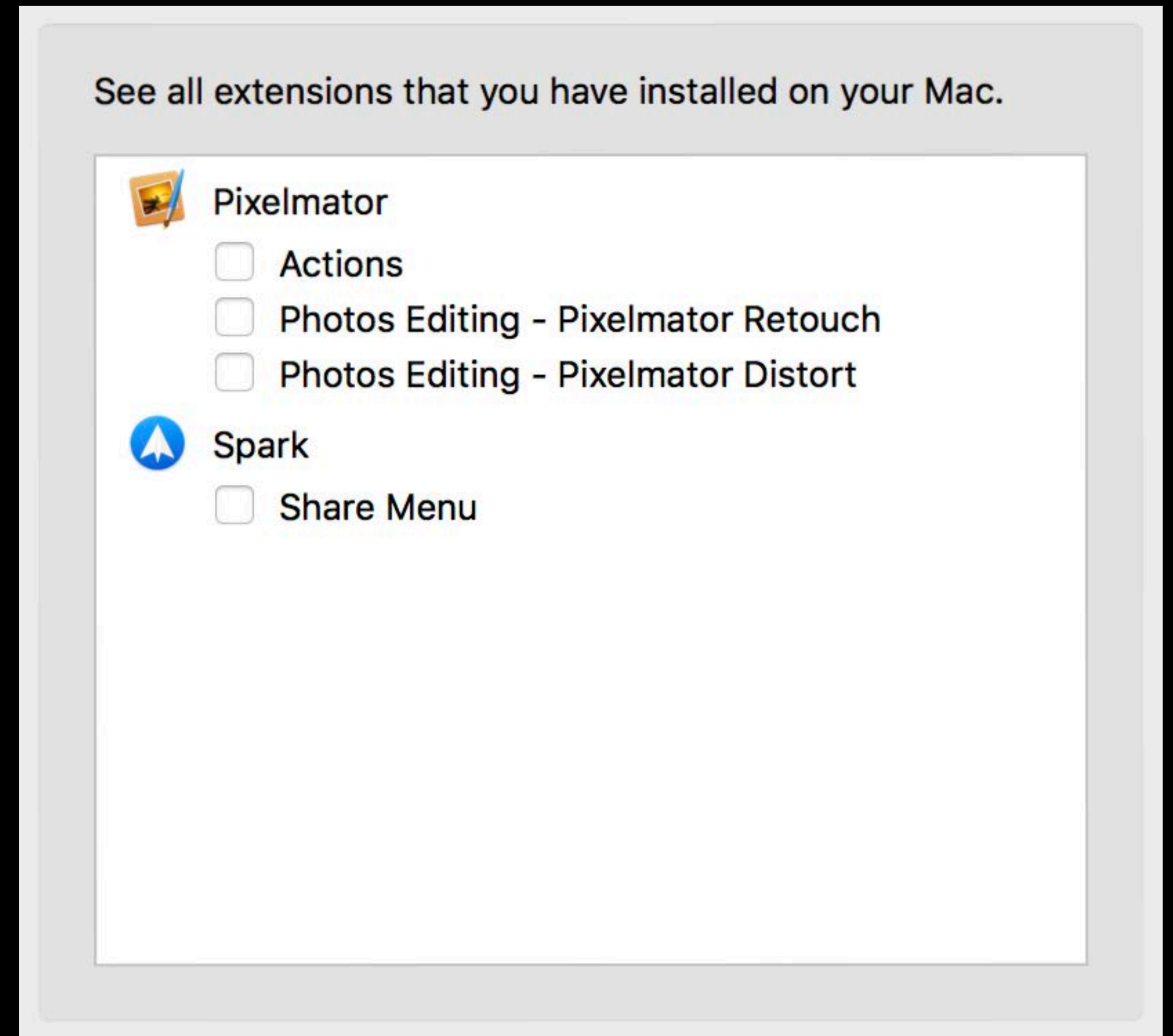
Interactive, vertical list view

Can be single-column

Arbitrary item content

Type-selection, keyboard navigation

Group rows



# NSTableView

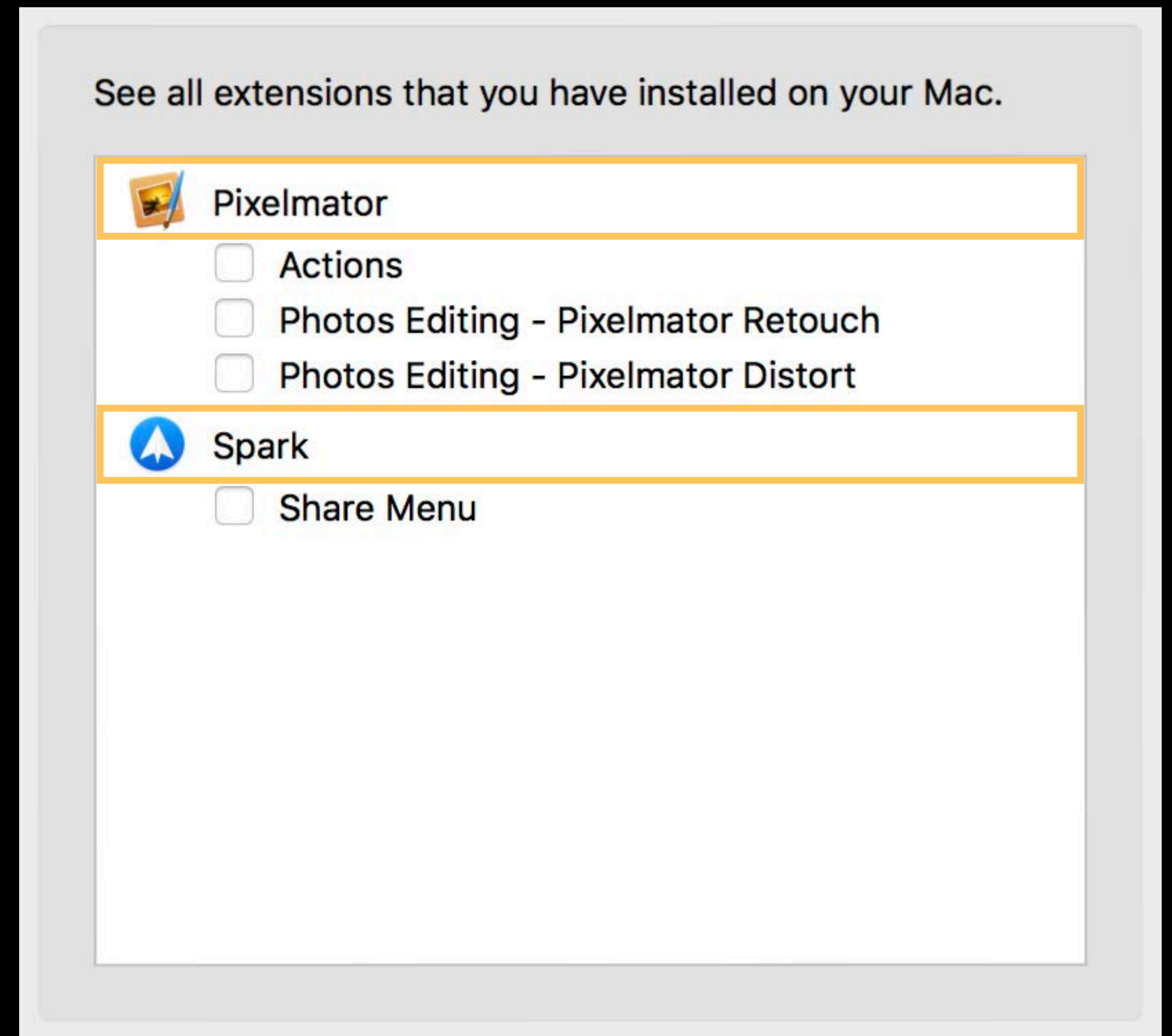
Interactive, vertical list view

Can be single-column

Arbitrary item content

Type-selection, keyboard navigation

Group rows



# NSTableView

Interactive, vertical list view

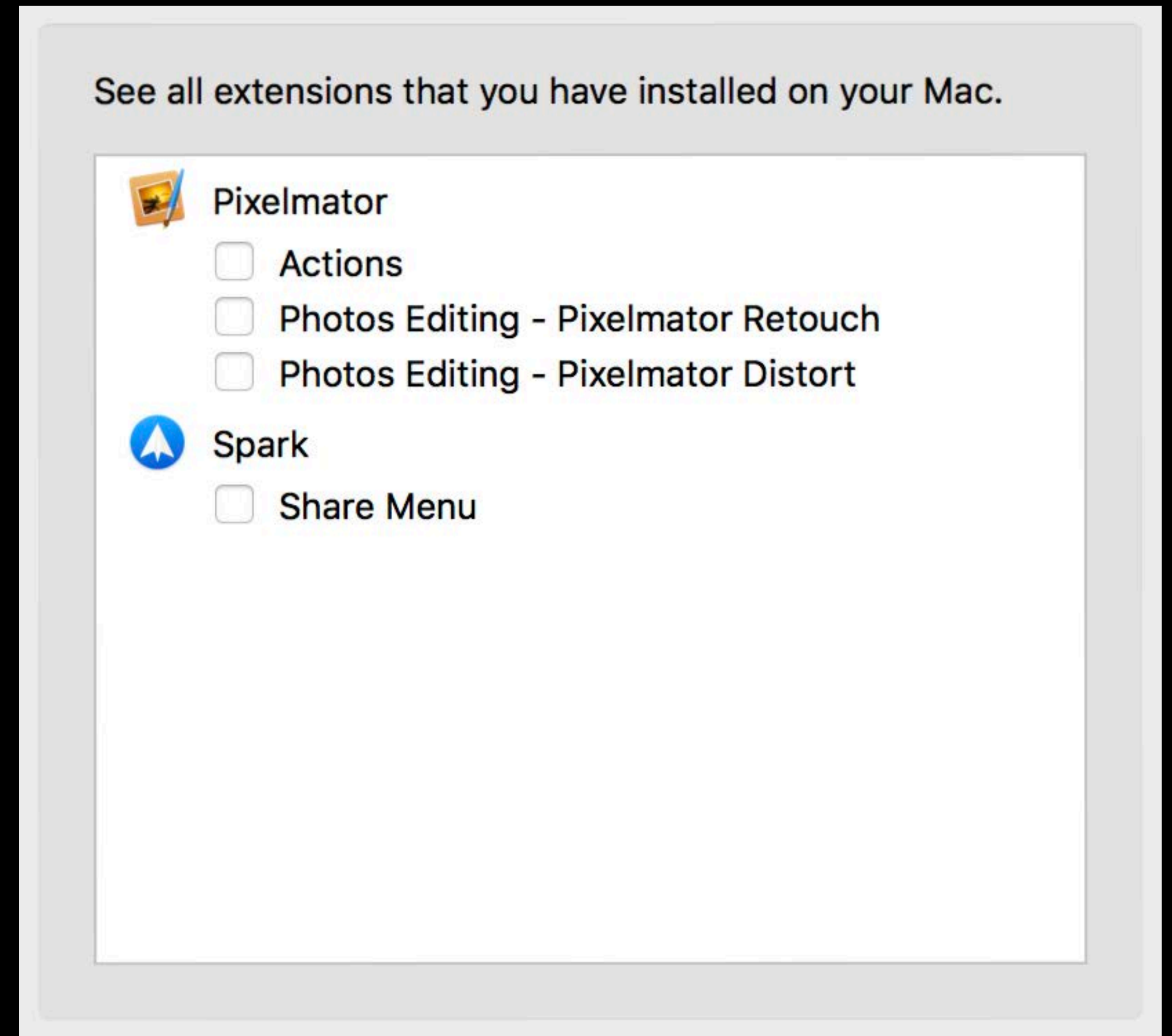
Can be single-column

Arbitrary item content

Type-selection, keyboard navigation

Group rows

Variable row height





# NSTableView

Interactive, vertical list view

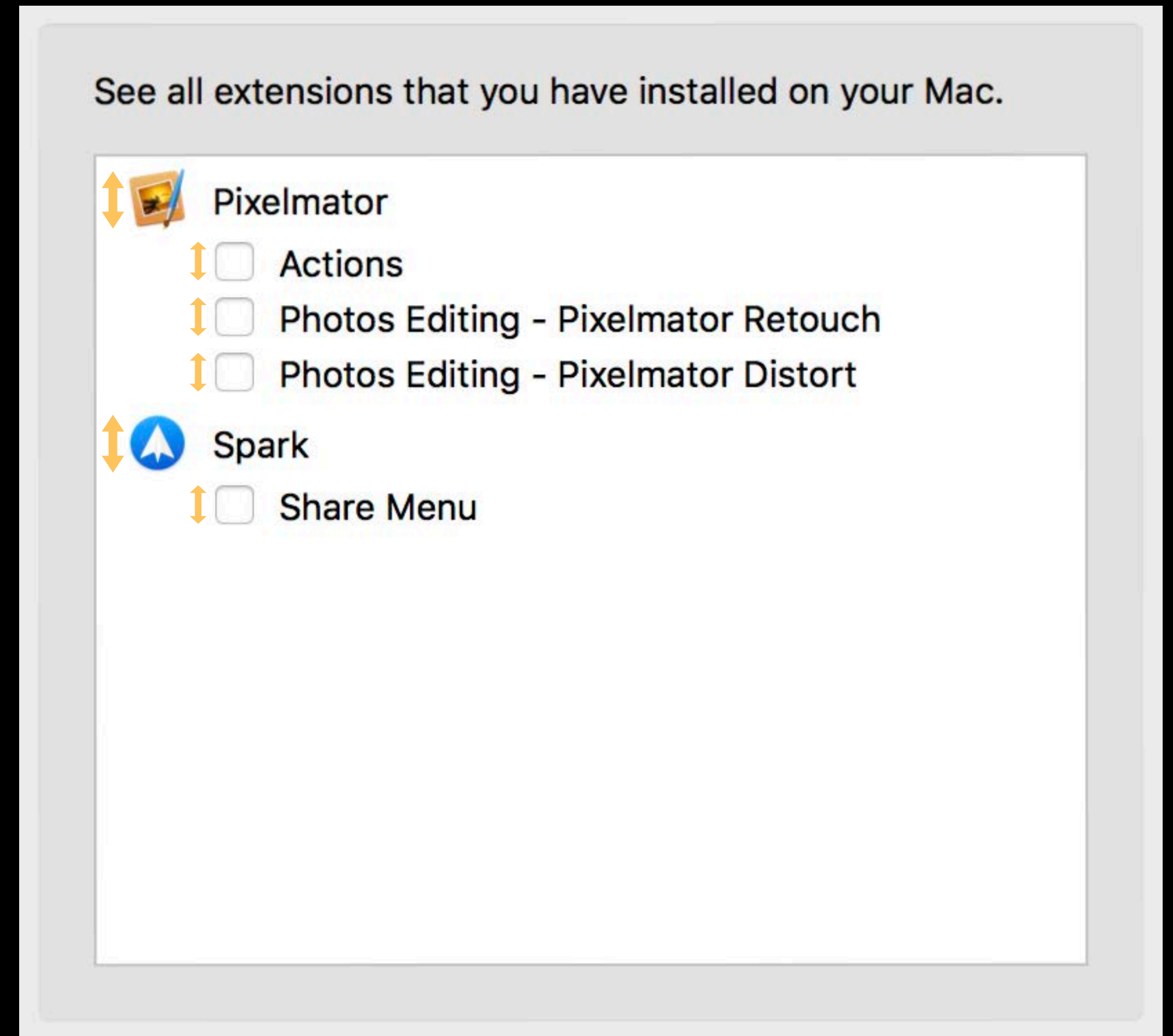
Can be single-column

Arbitrary item content

Type-selection, keyboard navigation

Group rows

Variable row height



# NSTableView

Interactive, vertical list view

Can be single-column

Arbitrary item content

Type-selection, keyboard navigation

Group rows

Variable row height

Row actions, change animations

iCloud

5/5/17

Welcome to iCloud Mail.



Welcome to iCloud Mail. Your email...

# NSTableView

Interactive, vertical list view

Can be single-column

Arbitrary item content

Type-selection, keyboard navigation

Group rows

Variable row height

Row actions, change animations

iCloud

5/5/17

Welcome to iCloud Mail.



Welcome to iCloud Mail. Your email...

# NSTableView

Scalable to large item counts

# NSTableView

Scalable to large item counts

Populate using Bindings, or a row-index-based data source

# NSTableView

Scalable to large item counts

Populate using Bindings, or a row-index-based data source

Versatile, easy way to present tabular data or lists

# NSTableView

Learn more

---

Crafting Modern Cocoa Apps

WWDC16

---

Guides: Table View Programming Guide for Mac

Sample Code: TableViewPlayground

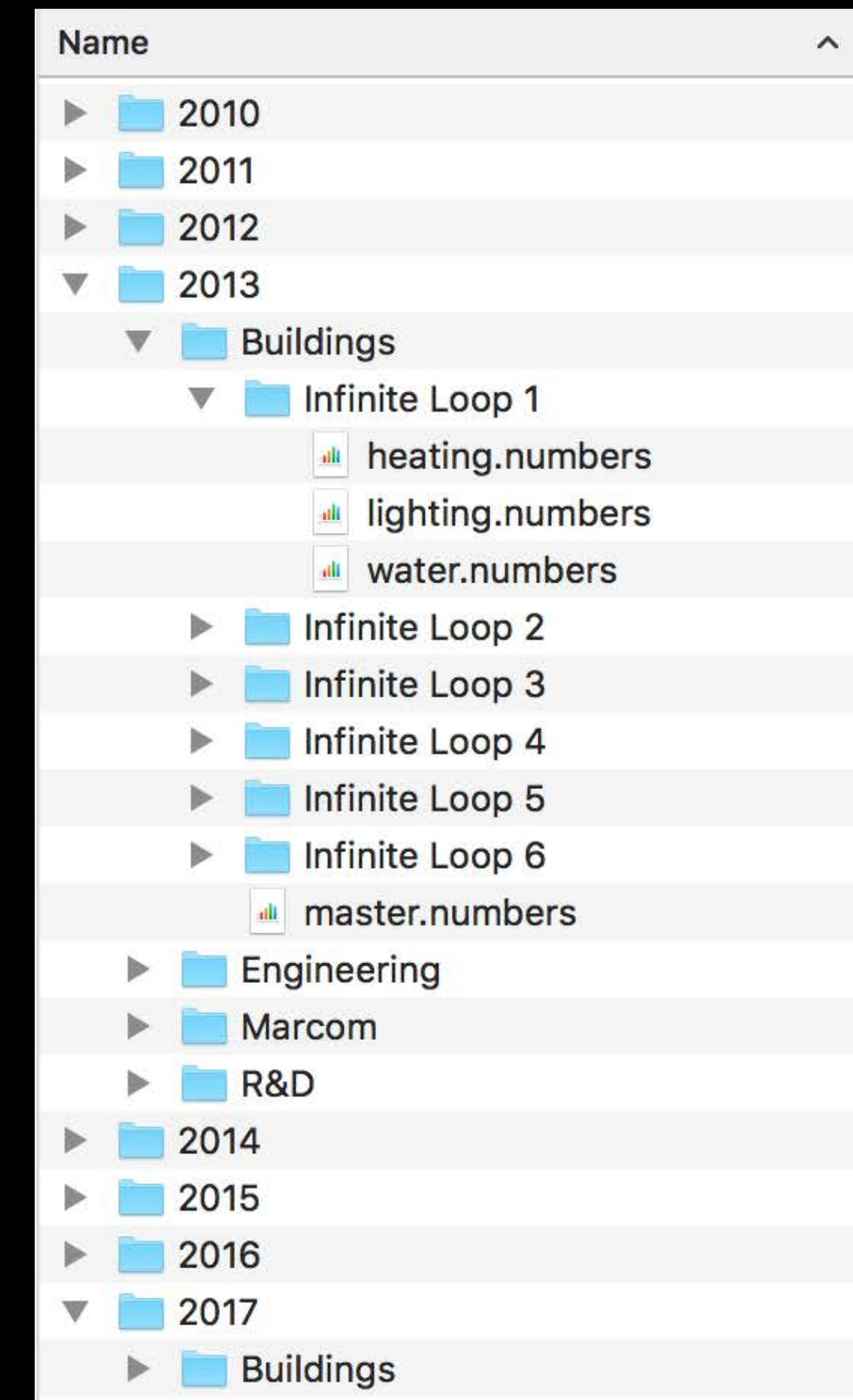
**What About Trees?** 🌲



# NSOutlineView

# NSOutlineView

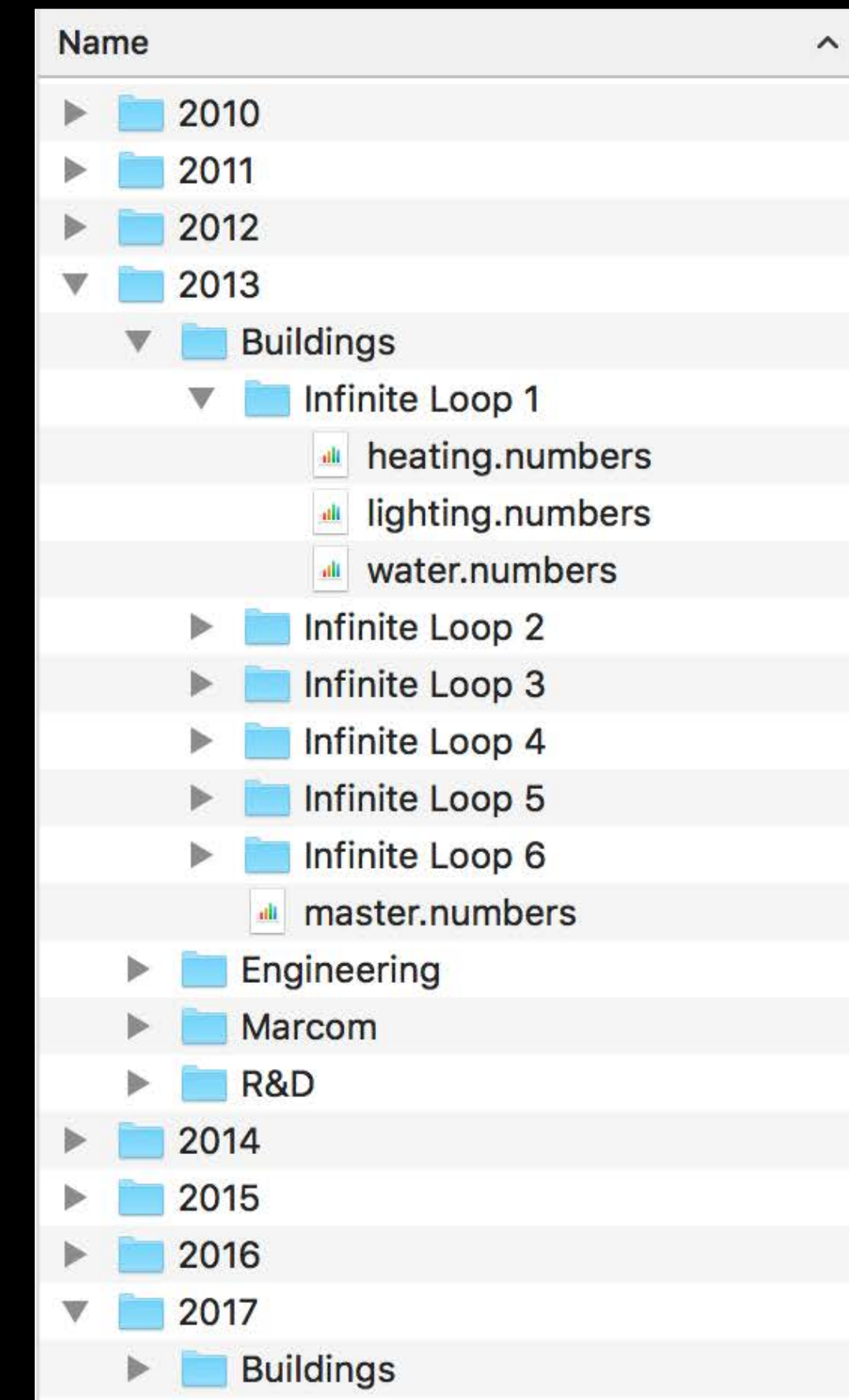
All the capabilities of NSTableView, plus:



# NSOutlineView

All the capabilities of NSTableView, plus:

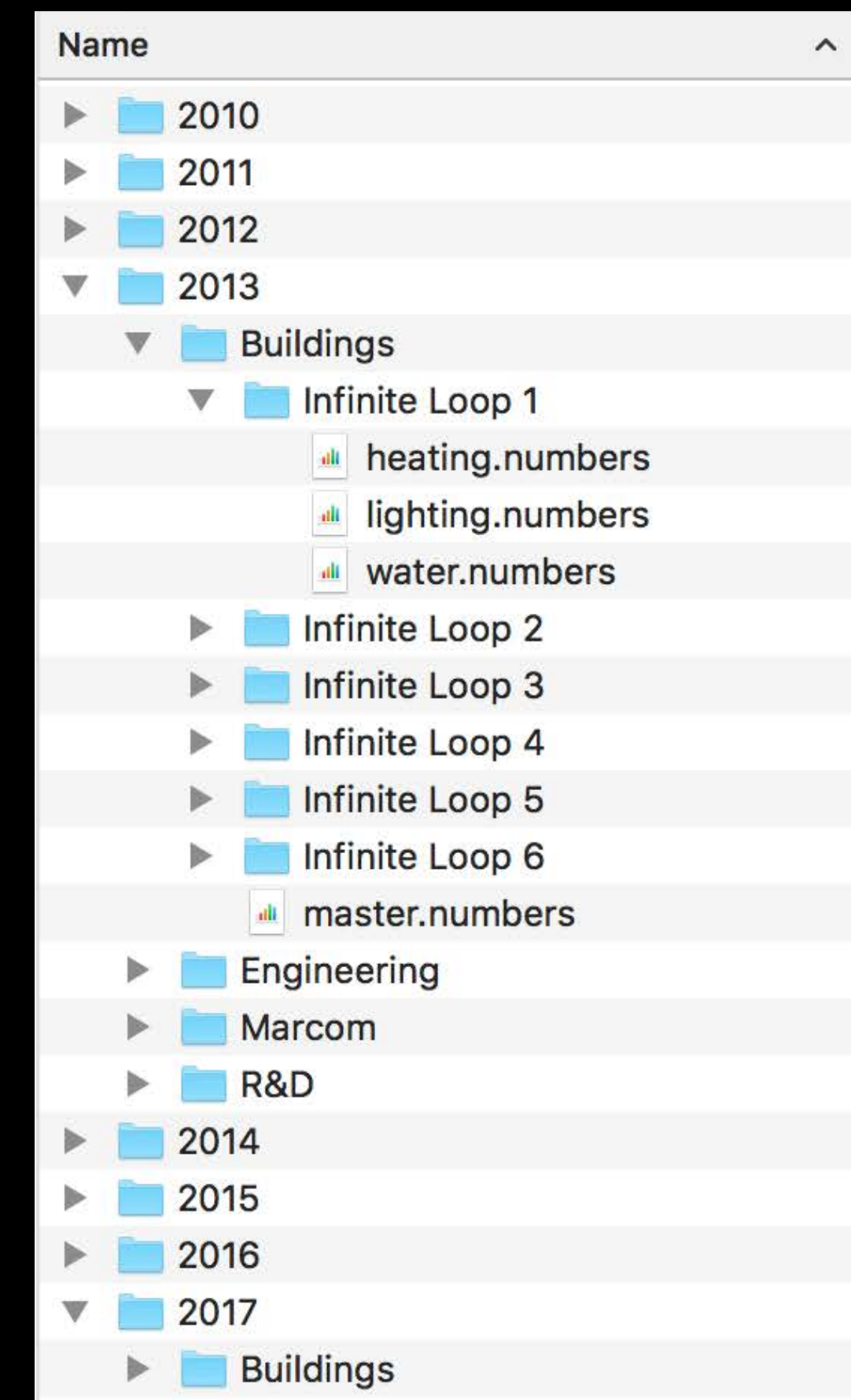
- A hierarchical data model



# NSOutlineView

All the capabilities of NSTableView, plus:

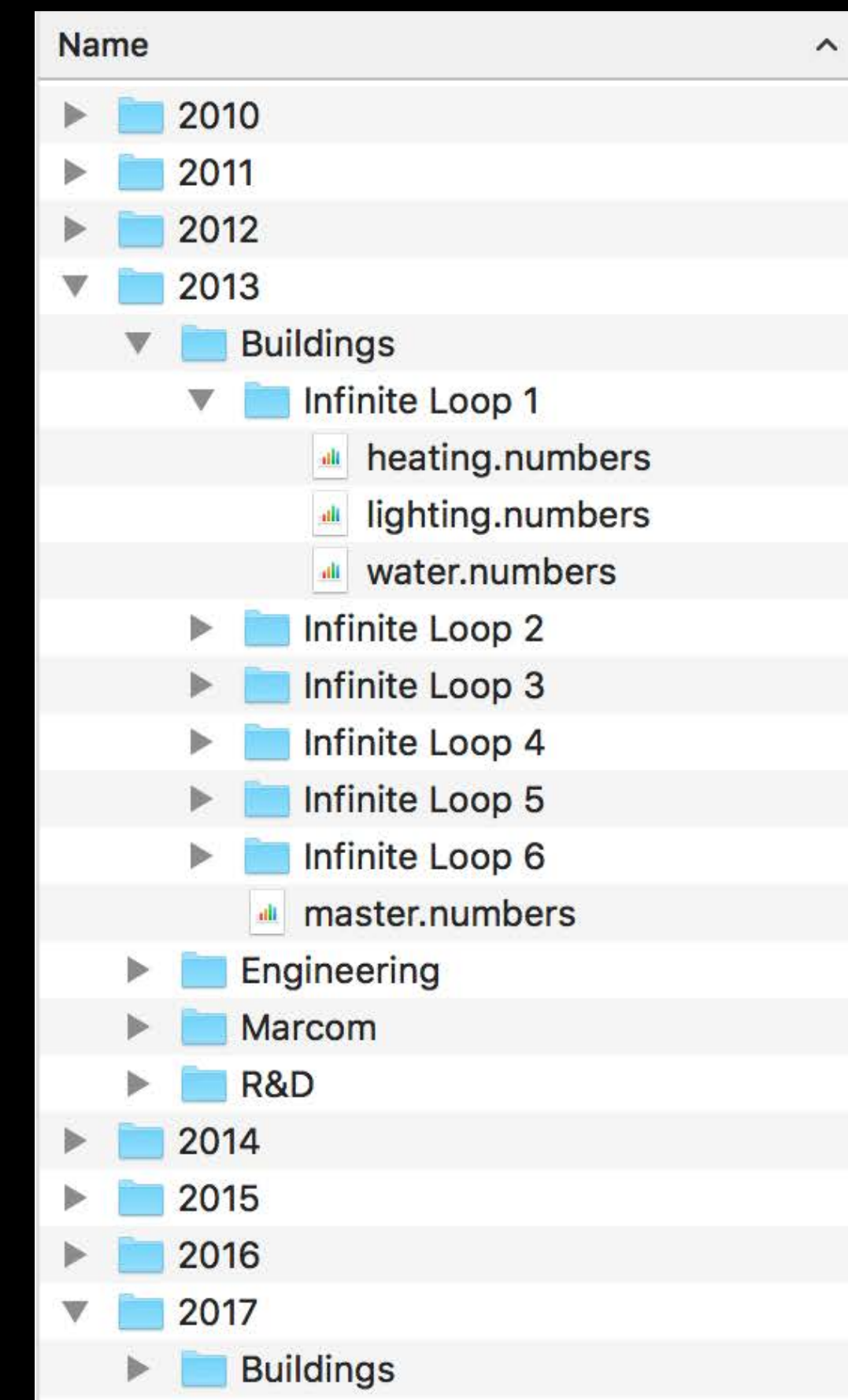
- A hierarchical data model
- Tracks model objects and their children



# NSOutlineView

All the capabilities of NSTableView, plus:

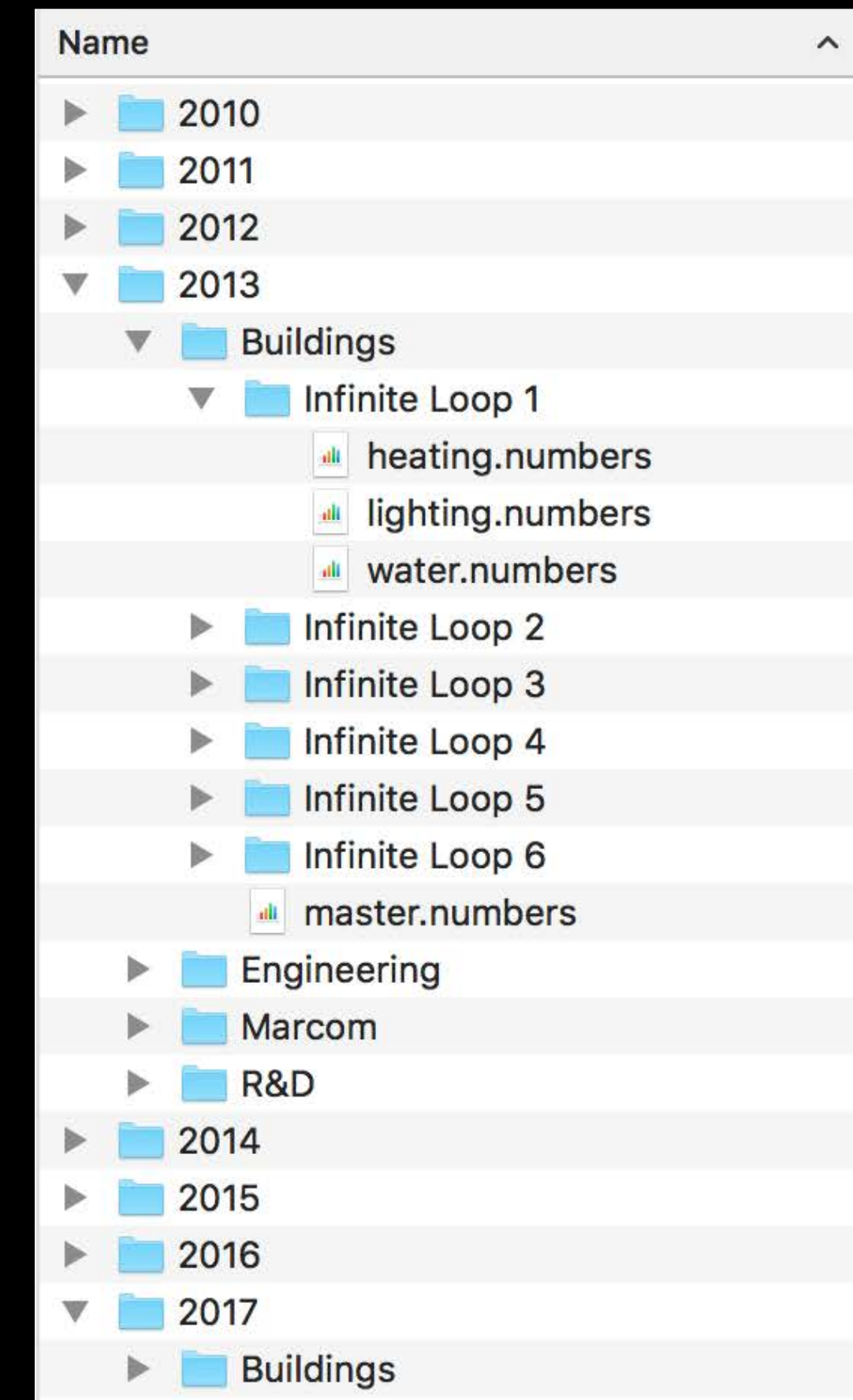
- A hierarchical data model
- Tracks model objects and their children
- Expandable/collapsible container nodes



# NSOutlineView

All the capabilities of NSTableView, plus:

- A hierarchical data model
- Tracks model objects and their children
- Expandable/collapsible container nodes
- User can explore multiple branches simultaneously



# NSOutlineView

Learn more

Guides: [Outline View Programming Topics](#), [Table View Programming Guide](#)

Sample Code: [TableViewPlayground](#)



## New Remote Connection

### Service

### Server

Secure Shell (ssh)	▶ flightline
Secure File Transfer (sftp)	▶ mini
File Transfer (ftp)	▶ satellite
Remote Login (telnet)	▶



User:

SSH (Automatic)



Connect






## New Remote Connection

Service	Server
Secure Shell (ssh)	▶ flightline
Secure File Transfer (sftp)	▶ mini
File Transfer (ftp)	▶ satellite
Remote Login (telnet)	▶



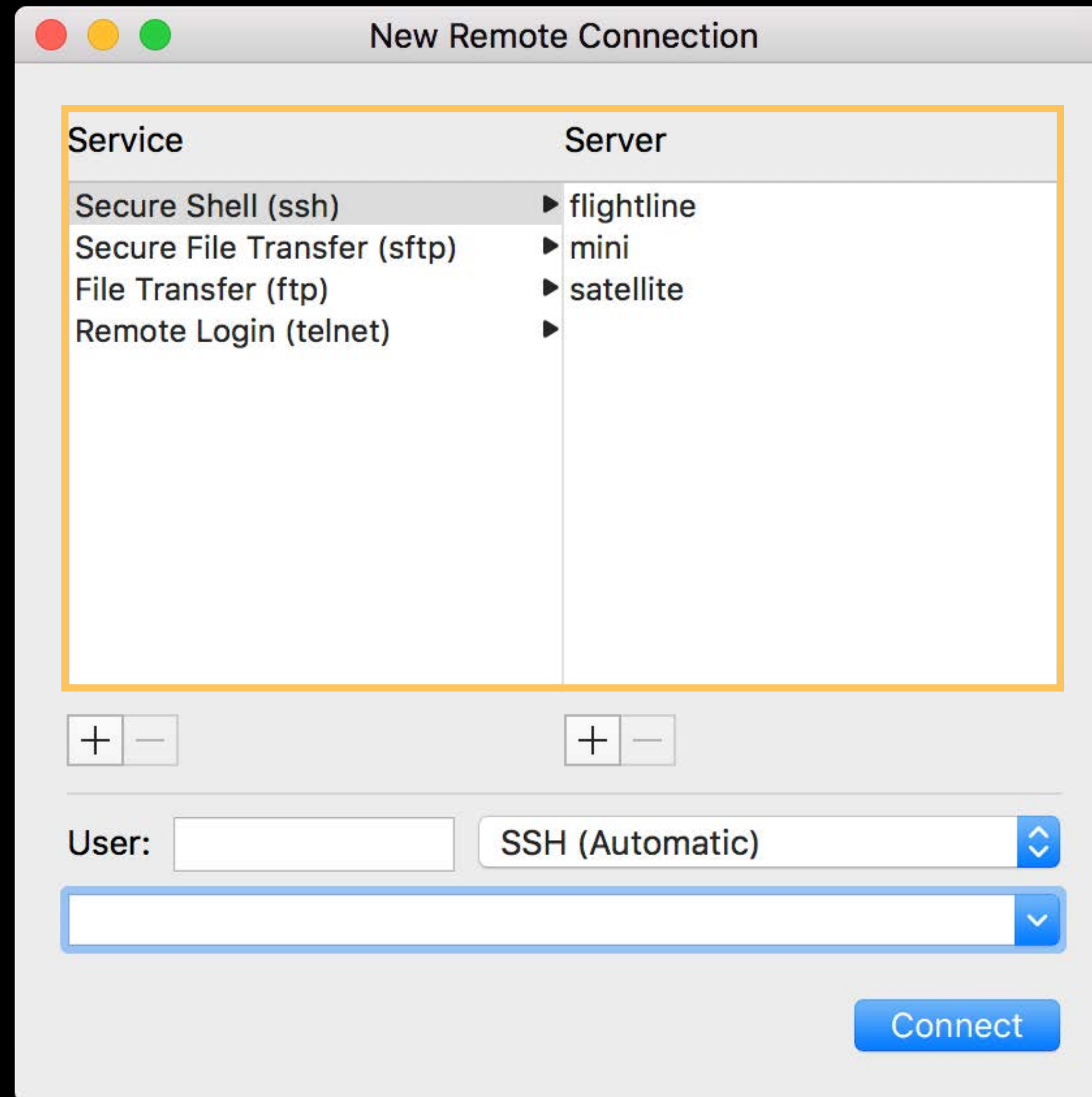
User:

SSH (Automatic) 

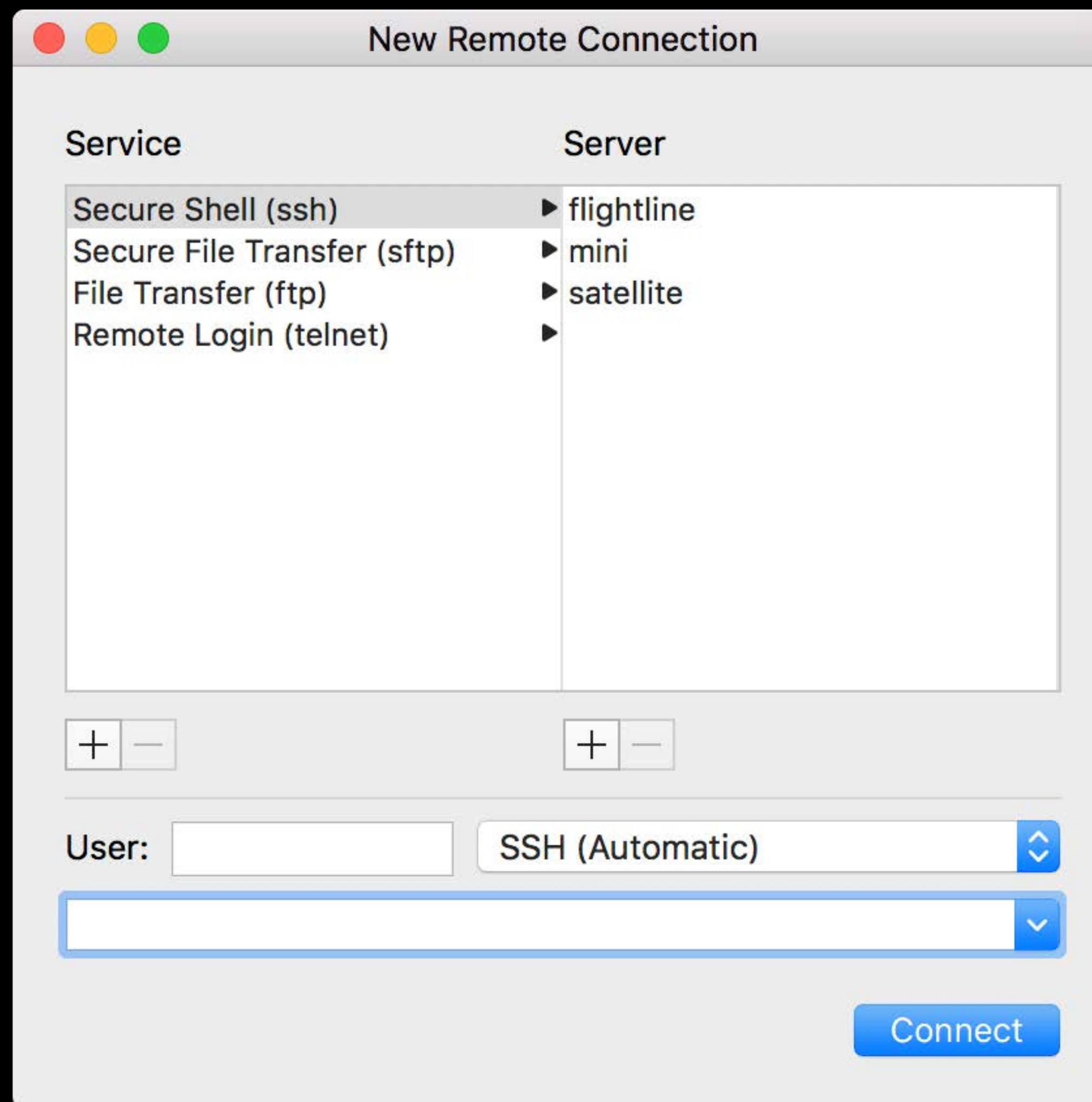


Connect

# NSBrowser



# NSBrowser





Complex Browser



Macintosh HD

- Applications
- Library
- System
- txhome
- Users

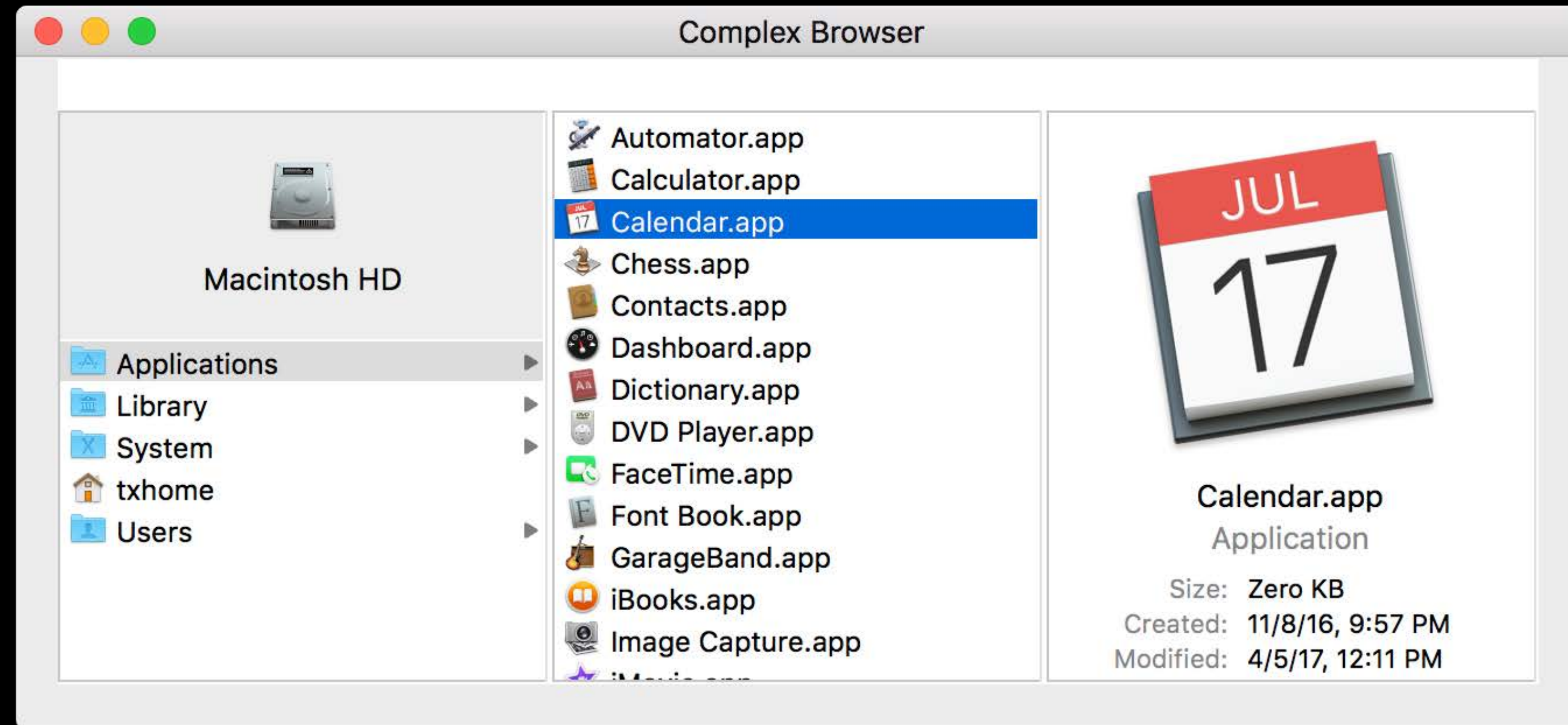
- Automator.app
- Calculator.app
- Calendar.app**
- Chess.app
- Contacts.app
- Dashboard.app
- Dictionary.app
- DVD Player.app
- FaceTime.app
- Font Book.app
- GarageBand.app
- iBooks.app
- Image Capture.app
- iMovie.app



Calendar.app  
Application

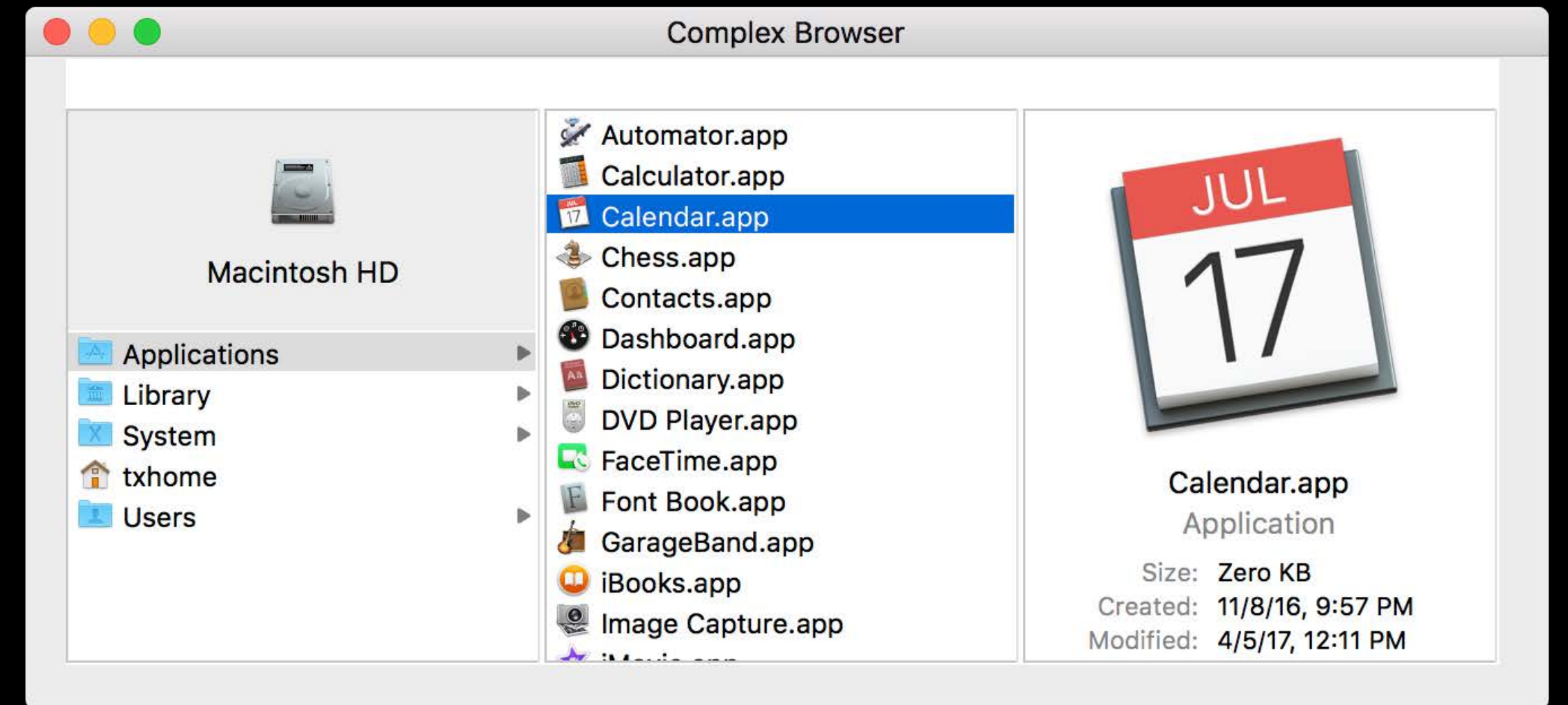
Size: Zero KB  
Created: 11/8/16, 9:57 PM  
Modified: 4/5/17, 12:11 PM

# NSBrowser



# NSBrowser

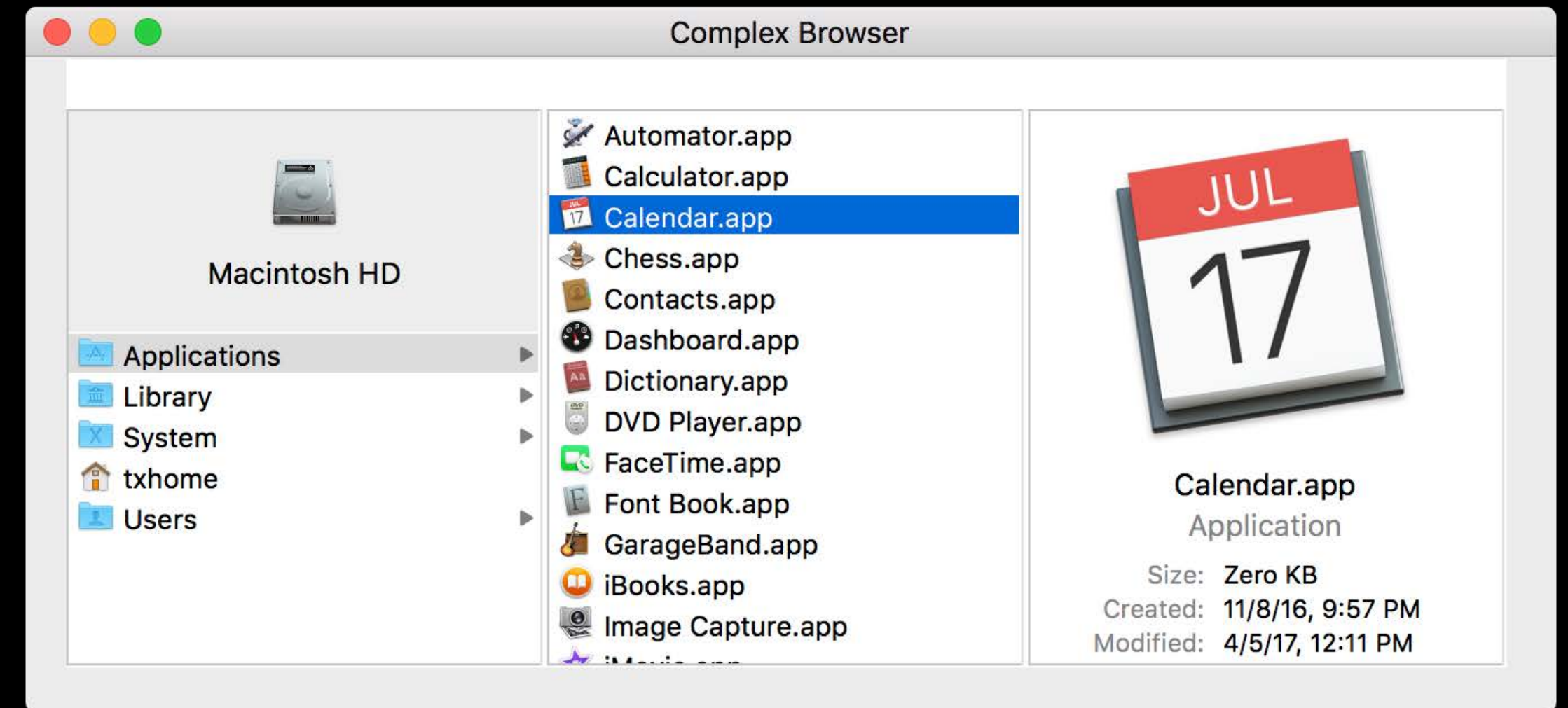
Column-based "drill down" UI



# NSBrowser

Column-based “drill down” UI

User-sizable columns

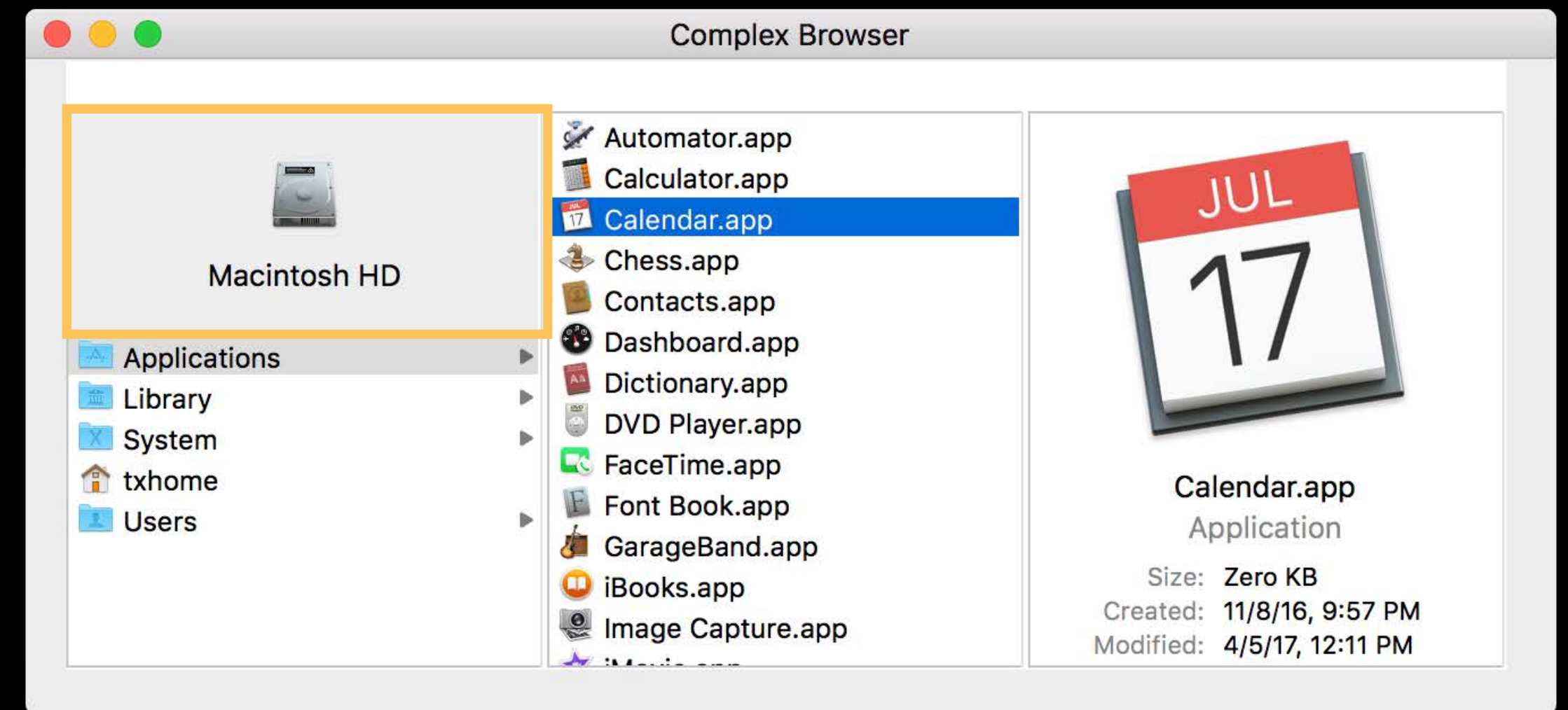


# NSBrowser

Column-based “drill down” UI

User-sizable columns

Optional custom header views





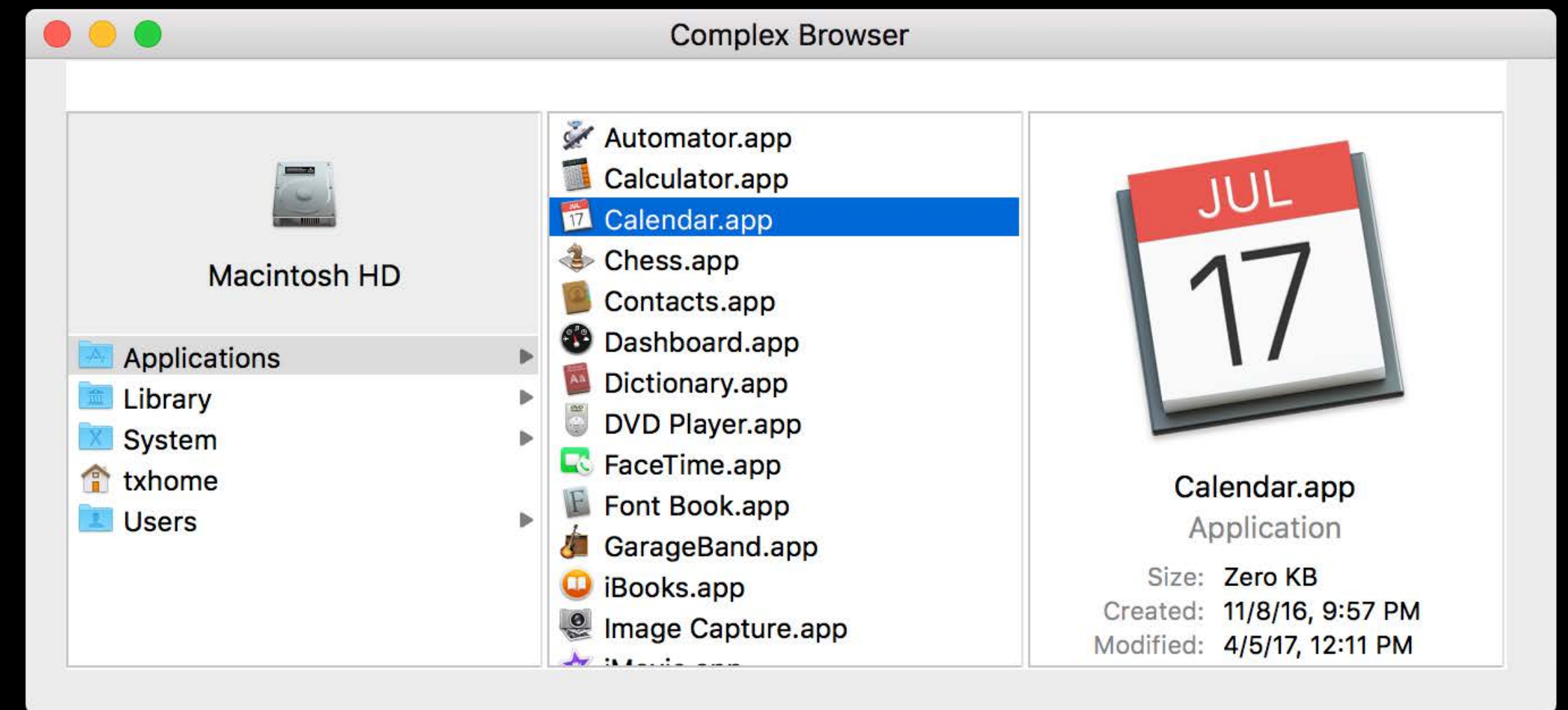
# NSBrowser

Column-based “drill down” UI

User-sizable columns

Optional custom header views

Optional custom preview ViewController



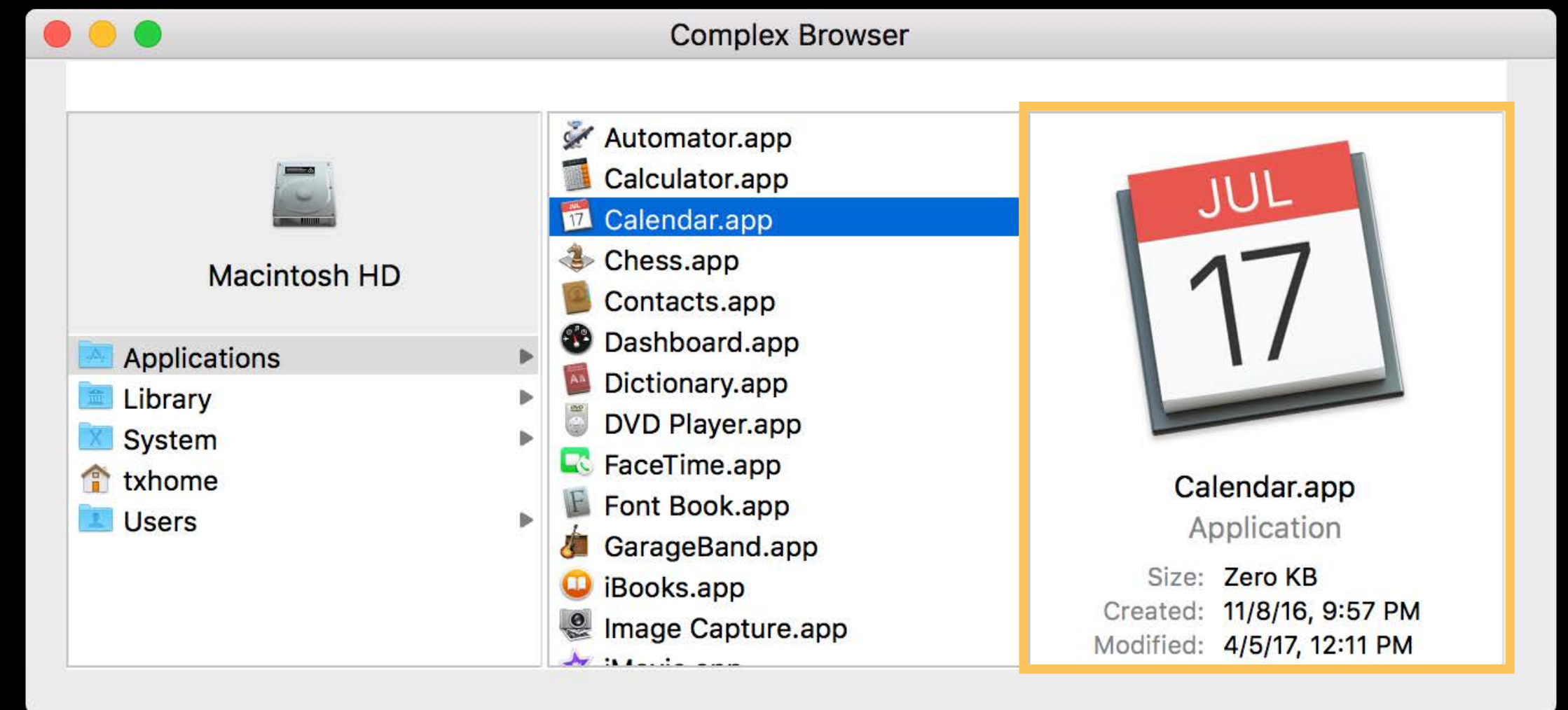
# NSBrowser

Column-based “drill down” UI

User-sizable columns

Optional custom header views

Optional custom preview ViewController



# NSBrowser

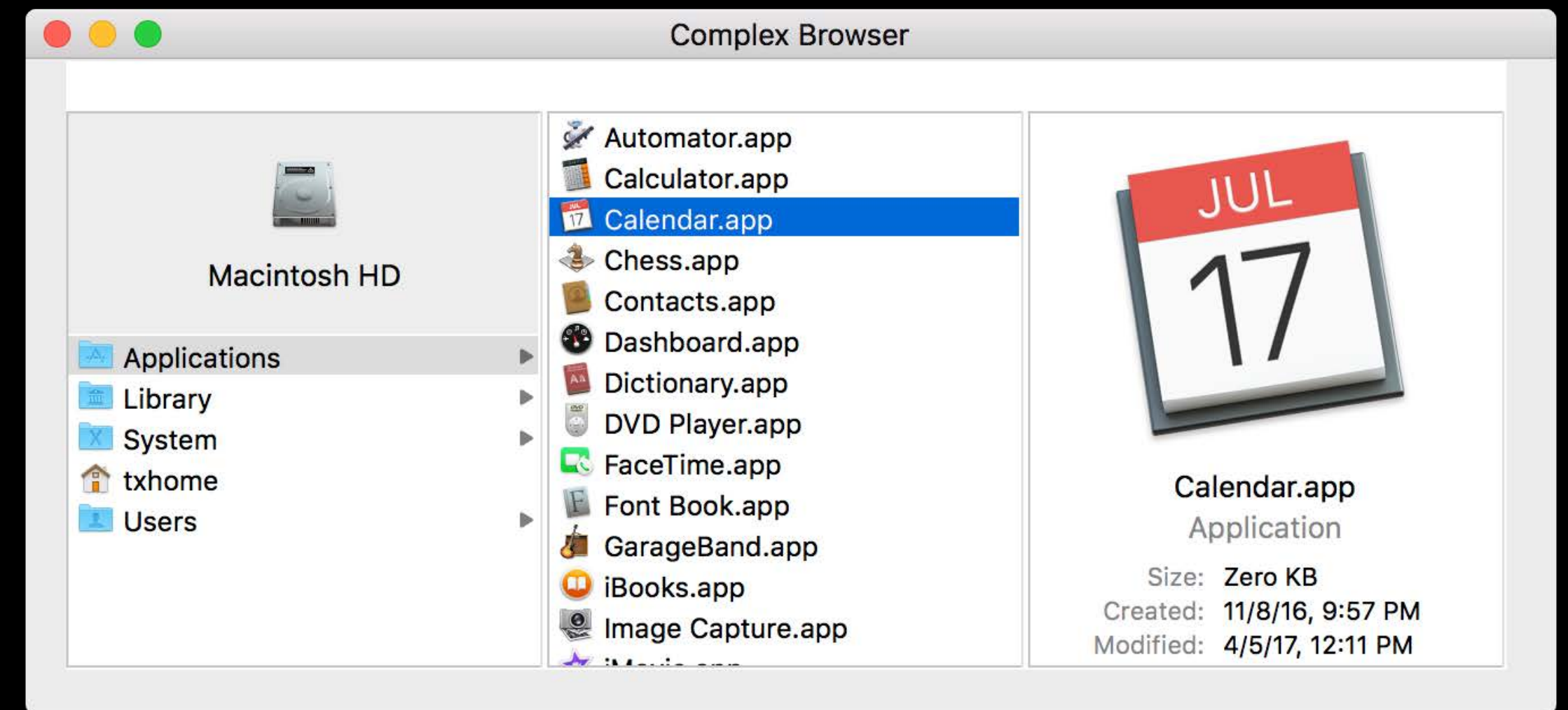
Column-based “drill down” UI

User-sizable columns

Optional custom header views

Optional custom preview ViewController

User can explore one branch at a time



# NSBrowser

Learn more

Guides: [Browser Programming Topics](#)

Sample Code: [SimpleCocoaBrowser](#), [ComplexBrowser](#)

What About Custom Layouts?

# UICollectionView

A customizable, scalable data view



# UICollectionView

A customizable, scalable data view

Arbitrary, developer-defined layouts

Easy, wrapped layout

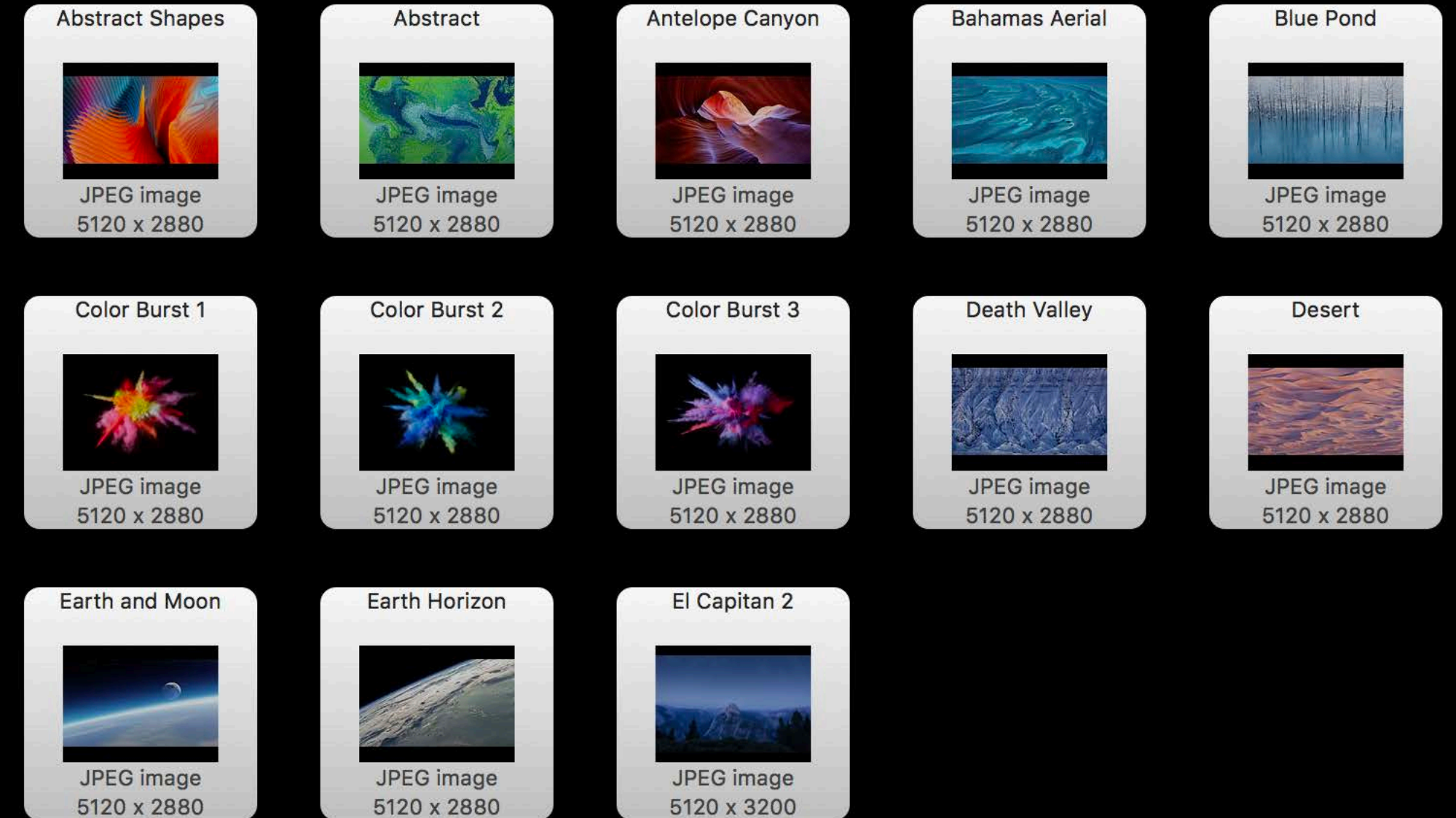


# UICollectionView

A customizable, scalable data view

Arbitrary, developer-defined layouts

Easy, wrapped layout



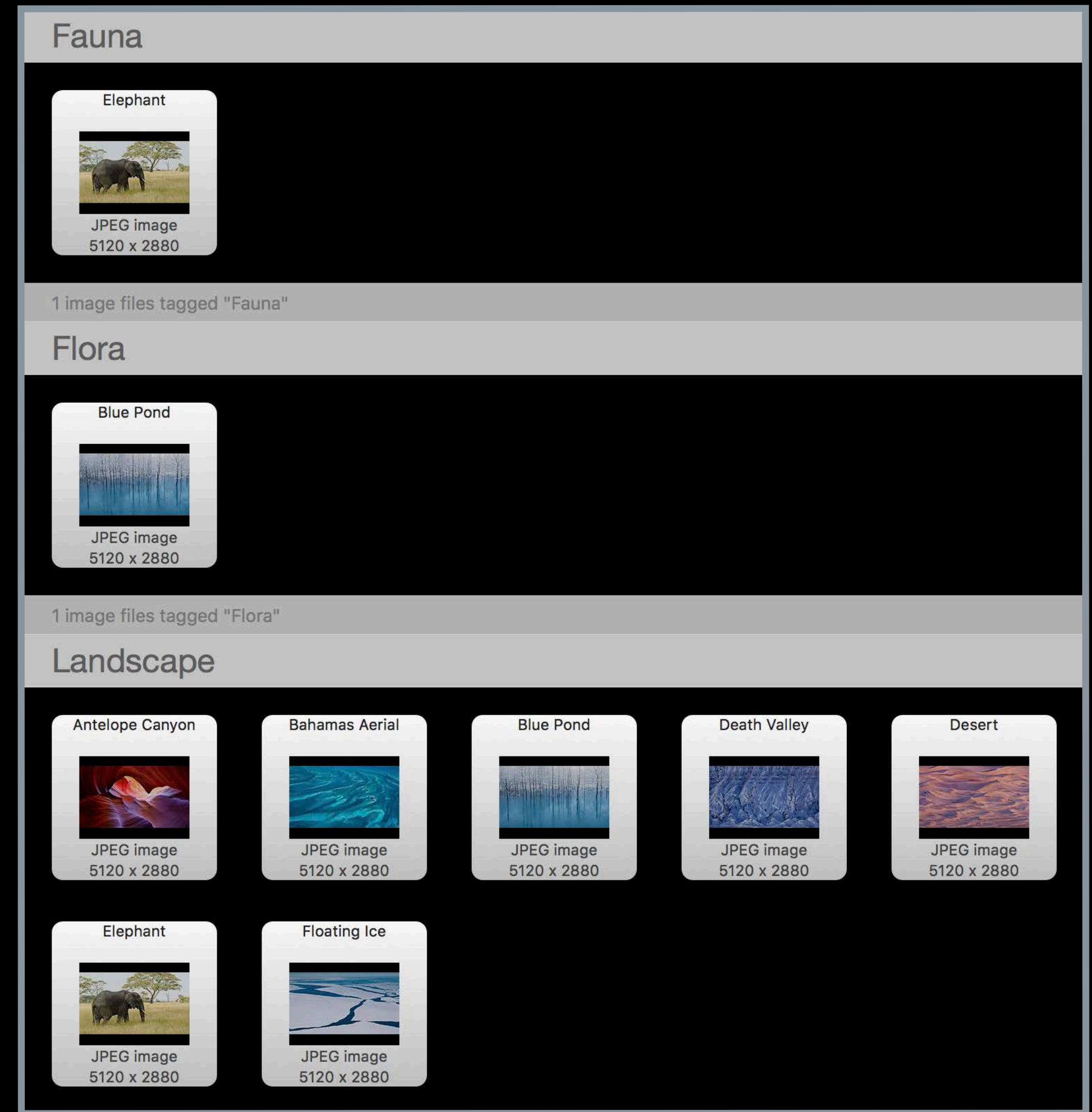
# UICollectionView

A customizable, scalable data view

Arbitrary, developer-defined layouts

Easy, wrapped layout

Optional sections, header and footer views



# NSCollectionView

A customizable, scalable data view

Arbitrary, developer-defined layouts

Easy, wrapped layout

Optional sections, header and footer views

Item selection, drag and drop



# UICollectionView

A customizable, scalable data view

Arbitrary, developer-defined layouts

Easy, wrapped layout

Optional sections, header and footer views

Item selection, drag and drop

Arbitrary item representation (view subtree)



# UICollectionView

A customizable, scalable data view

Arbitrary, developer-defined layouts

Easy, wrapped layout

Optional sections, header and footer views

Item selection, drag and drop

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# UICollectionView

A customizable, scalable data view

Arbitrary, developer-defined layouts

Easy, wrapped layout

Optional sections, header and footer views

Item selection, drag and drop

Arbitrary item representation (view subtree)

Scalable, sparing item instantiation and reuse







# UICollectionView

Learn more

---

What's New in UICollectionView

WWDC15

---

Sample Code: CocoaSlideCollection

Reference: UICollectionView, UICollectionViewLayout, and friends

# Choosing the Right Container View

Raleigh Ledet, AppKit Engineer

NSStackView  
NSGridView

NSCollectionView  
NSTableView  
NSOutlineView  
NSBrowser

High level layout;  
Simple, configurable

NSStackView  
NSGridView

Display dynamic data  
Interactivity

NSCollectionView  
NSTableView  
NSOutlineView  
NSBrowser

Tabular

Tree structure

Grid or custom layout

NSCollectionView  
NSTableView  
NSOutlineView  
NSBrowser

Tabular

NSTableView,  
NSOutlineView

Tree structure

NSOutlineView,  
NSBrowser

Grid or custom layout

NSCollectionView

# Case Studies

Raleigh Ledet, AppKit Engineer


# Mail: Message List

Inbox (172 messages)

Mailboxes **Inbox** VIPs v Sent Drafts (39) Flagged v

Sort by Date v

<b>Jennifer Baker</b>	10/2/14
Saturday	471 bytes
Craig, Want to get a BBQ going for this Saturday? Sam and Mic...	
<b>Nina Stewart</b>	9/24/14
Troy's Birthday	2.7 MB
Hey Everyone, Thanks for joining us for Troy's birthday. We all...	
<b>Darin Adler via OpenTable</b>	6/2/14
Restaurant Invitation to Kuleto's	5 KB
Darin Adler has invited you to dine! Kuleto's Monday, June 2, 2...	
<b>Kim Vorrath</b>	5/12/14
X-Men Opening Day	2 KB
Anyone want to see X-Men opening day? It's getting great revie...	
<b>Neil Maclaren</b>	3/22/14
Place for dinner	1.5 MB
Details on the team dinner below. I've heard this place is great!	

★ **Nina Stewart** 1/4/12 

Breakfast Reservations

To: John Appleseed

---

Hi John,

I was thinking we could take the kids out for brunch one of these days. It'd be nice to get everyone together and the kids will have a blast. Maybe we could get four or five families together. If you're interested, let me know so I can talk to the other Dads and start looking into restaurants. The peninsula seems like a pretty central location for this event. In downtown Palo Alto, Il Fornaio and Saint Michael's Alley both do a full brunch. Il Fornaio has a private room that could work well for a large group like this. There are also some parks that are walking distance. Maybe we could give the moms some time together and take the kids to the park.

Another option is to make this a day in the city. There are a lot of great brunch spots in San Francisco. I hear Mama's is really good but I need to




# Mail: Message List

Inbox (172 messages)

Mailboxes **Inbox** VIPs v Sent Drafts (39) Flagged v

Sort by Date v

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Hey Everyone, Thanks for joining us for Troy's birthday. We all...	
<b>Darin Adler via OpenTable</b>	6/2/14
Restaurant Invitation to Kuleto's	5 KB
Darin Adler has invited you to dine! Kuleto's Monday, June 2, 2...	
<b>Kim Vorrath</b>	5/12/14
X-Men Opening Day	2 KB
Anyone want to see X-Men opening day? It's getting great revie...	
<b>Neil Maclaren</b>	3/22/14
Place for dinner	1.5 MB
Details on the team dinner below. I've heard this place is great!	

☆ **Nina Stewart** 1/4/12 

Breakfast Reservations

To: John Appleseed

Hi John,

I was thinking we could take the kids out for brunch one of these days. It'd be nice to get everyone together and the kids will have a blast. Maybe we could get four or five families together. If you're interested, let me know so I can talk to the other Dads and start looking into restaurants. The peninsula seems like a pretty central location for this event. In downtown Palo Alto, Il Fornaio and Saint Michael's Alley both do a full brunch. Il Fornaio has a private room that could work well for a large group like this. There are also some parks that are walking distance. Maybe we could give the moms some time together and take the kids to the park.

Another option is to make this a day in the city. There are a lot of great brunch spots in San Francisco. I hear Mama's is really good but I need to

# Mail: Message List

NSStackView

NSGridView

NSCollectionView

NSTableView

NSOutlineView

NSBrowser

# Mail: Message List

Unbounded number of emails

NSStackView

NSGridView

NSCollectionView

NSTableView

NSOutlineView

NSBrowser

# Mail: Message List

Unbounded number of emails

~~NSStackView~~

~~NSGridView~~

NSCollectionView

NSTableView

NSOutlineView

NSBrowser

# Mail: Message List

Unbounded number of emails

Selectable

~~NSStackView~~

~~NSGridView~~

NSCollectionView

NSTableView

NSOutlineView

NSBrowser

# Mail: Message List

Unbounded number of emails

Selectable

Lots of properties: sender, subject, etc...

~~NSStackView~~

~~NSGridView~~

NSCollectionView

NSTableView

NSOutlineView

NSBrowser

# Mail: Message List

Unbounded number of emails

Selectable

Lots of properties: sender, subject, etc...

~~NSStackView~~

~~NSGridView~~

~~NSCollectionView~~

NSTableView

NSOutlineView

~~NSBrowser~~

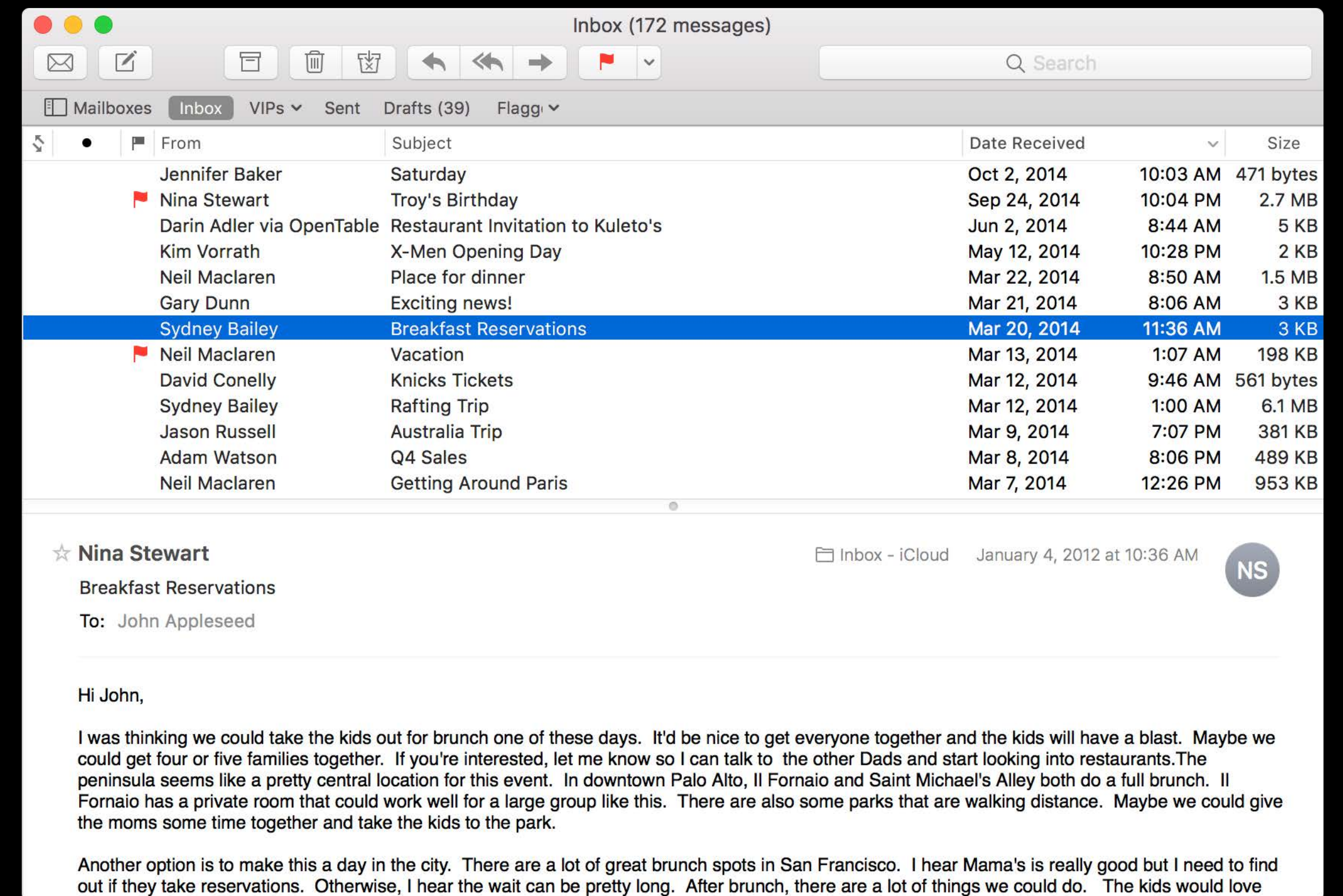
# Mail: Message List

Unbounded number of emails

Selectable

Lots of properties: sender, subject, etc...

NSOutlineView





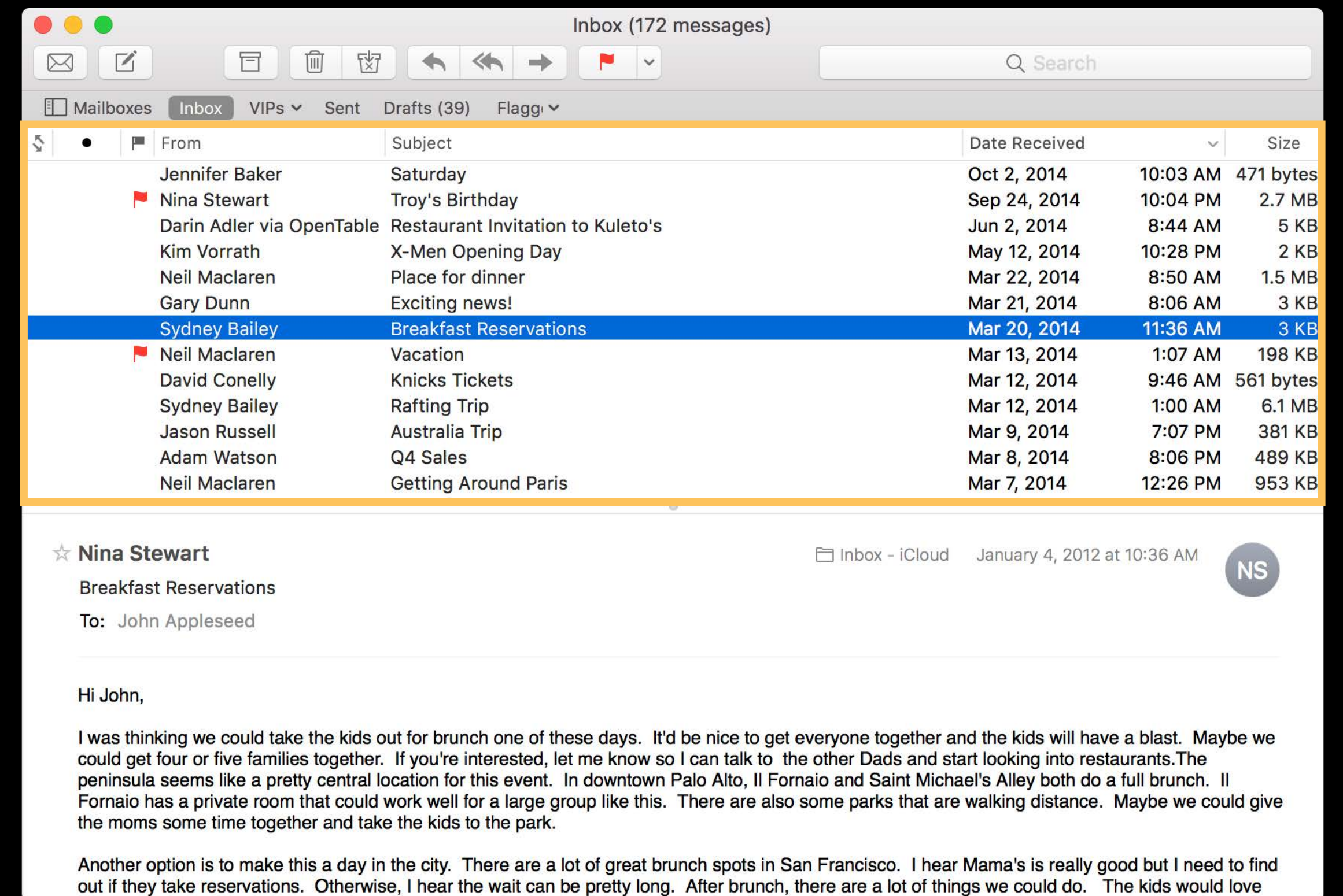
# Mail: Message List

Unbounded number of emails

Selectable

Lots of properties: sender, subject, etc...

NSOutlineView



# Mail: Message List

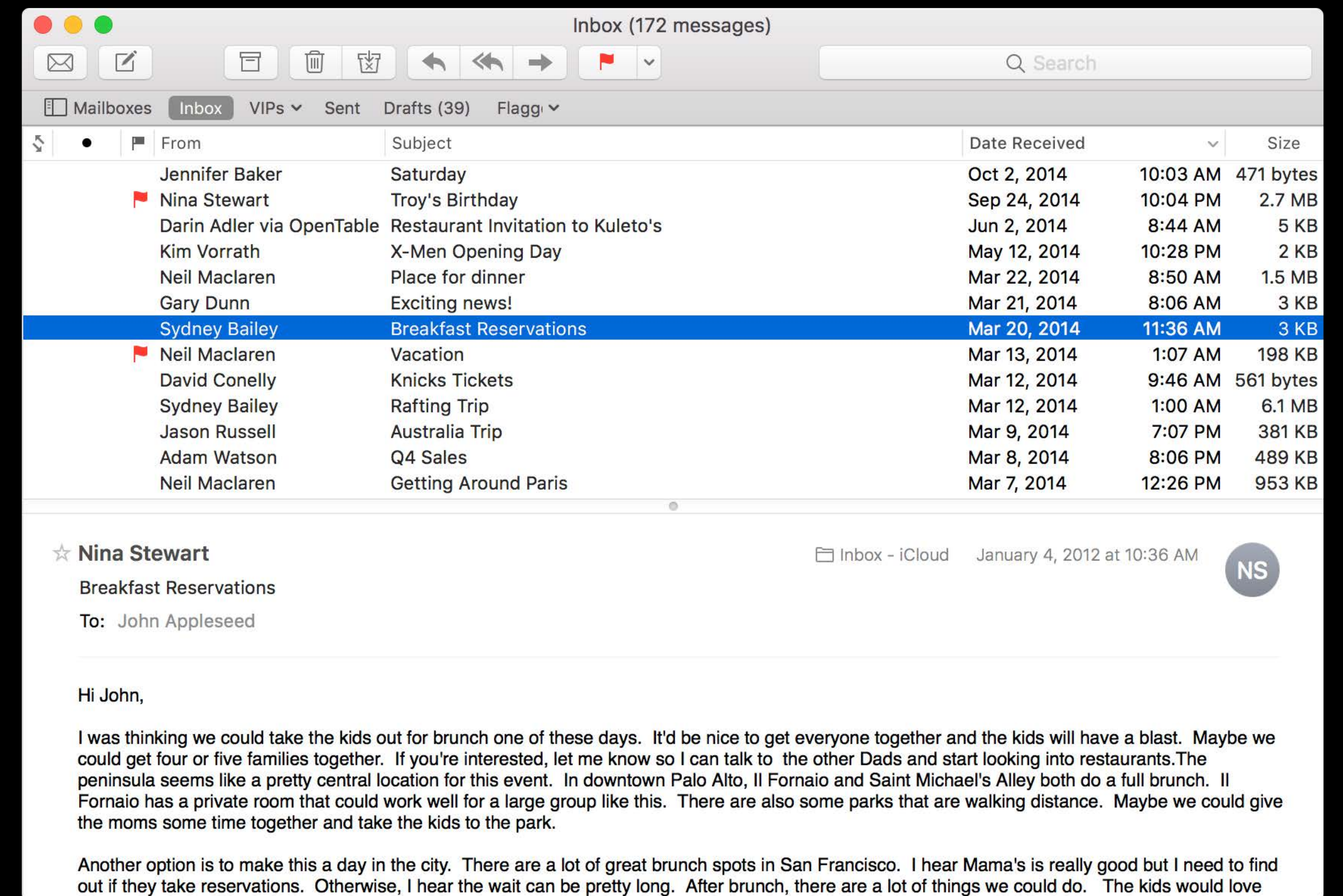
Unbounded number of emails

Selectable

Lots of properties: sender, subject, etc...

Critique use of space

NSOutlineView



# Mail: Message List

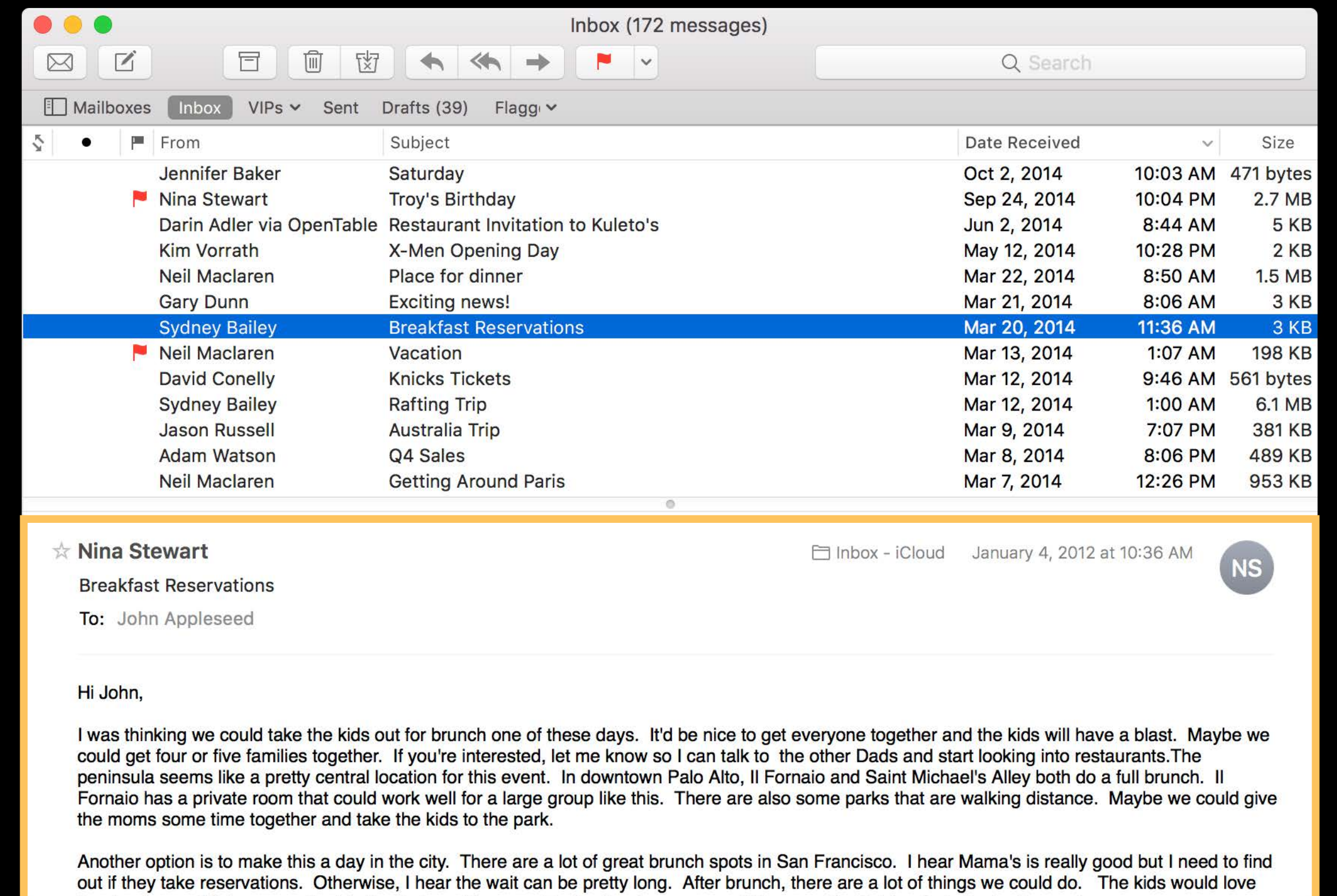
Unbounded number of emails

Selectable

Lots of properties: sender, subject, etc...

Critique use of space

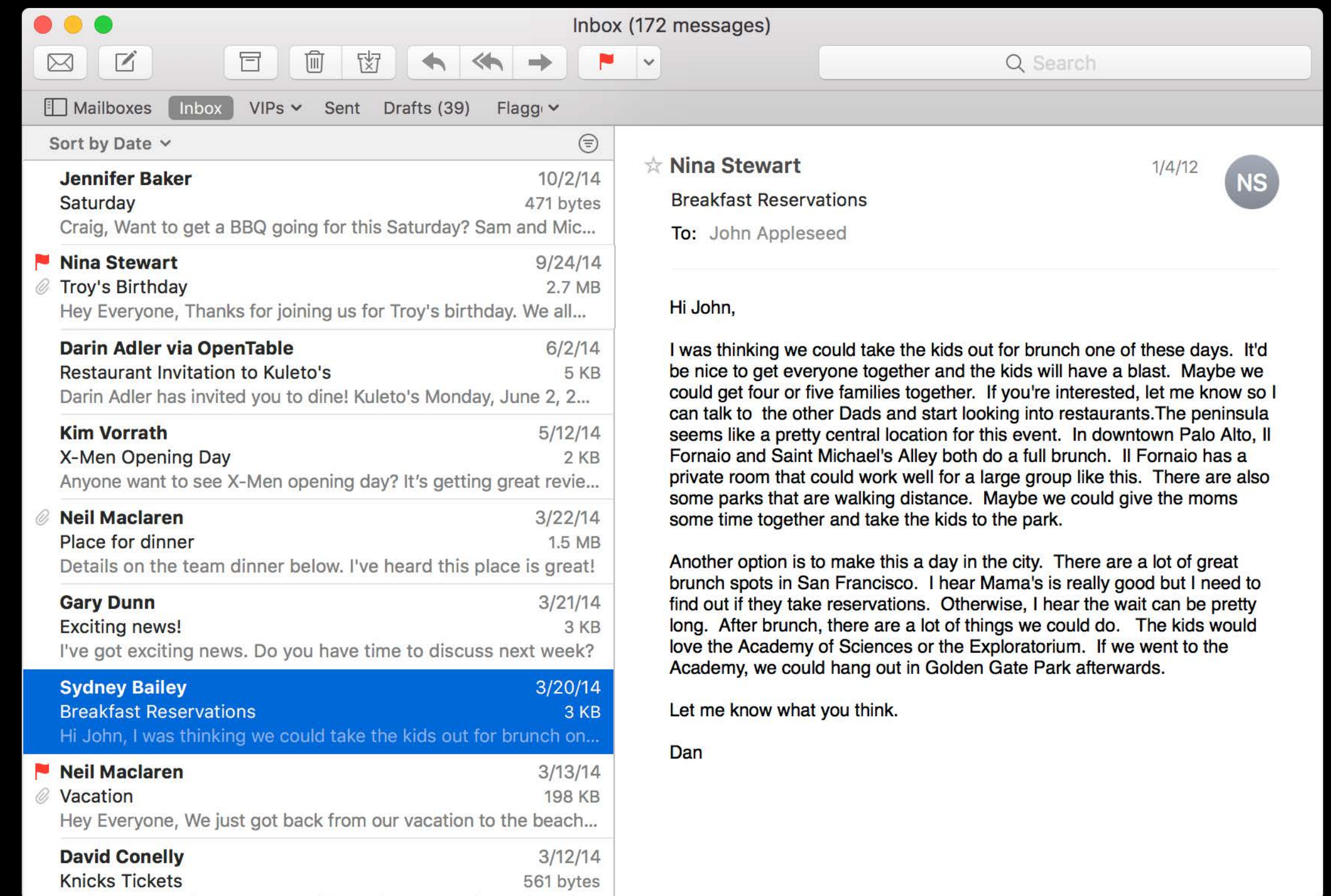
NSOutlineView



# Mail: Message List

Critique use of space

NSTableView

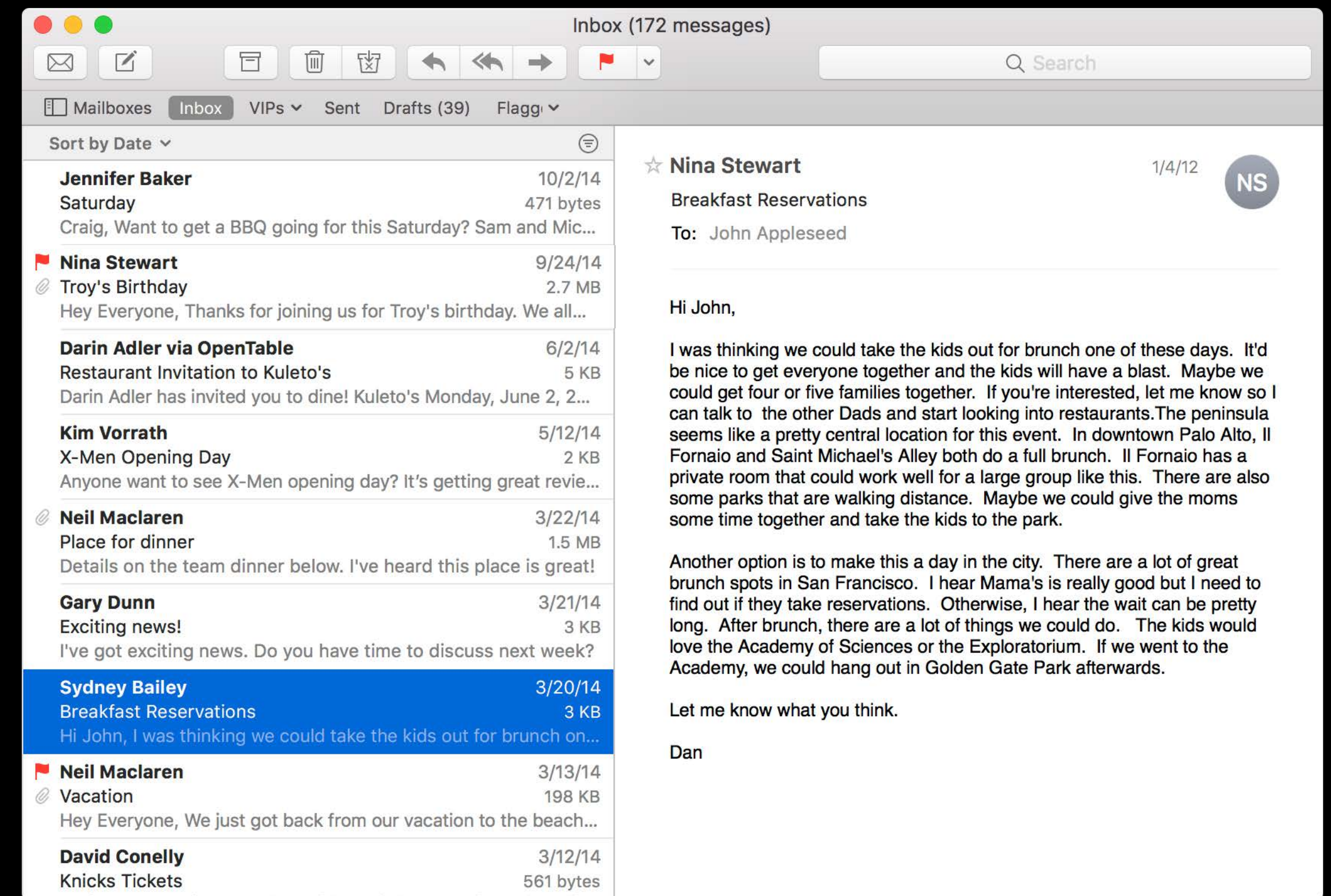


# Mail: Message List

Critique use of space

Consider tradeoffs

## NSTableView



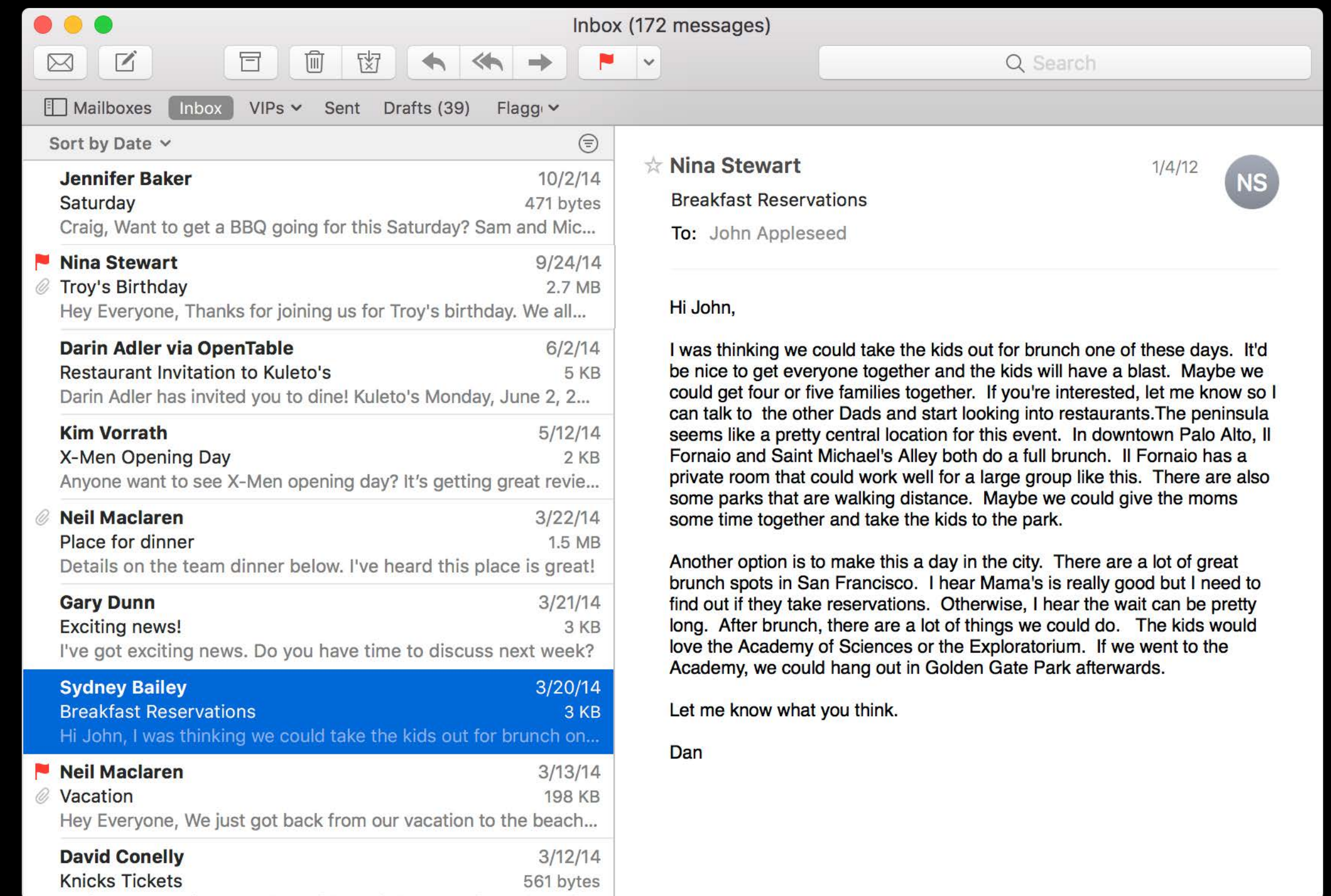
# Mail: Message List

Critique use of space

Consider tradeoffs

- Add new way to sort

## NSTableView



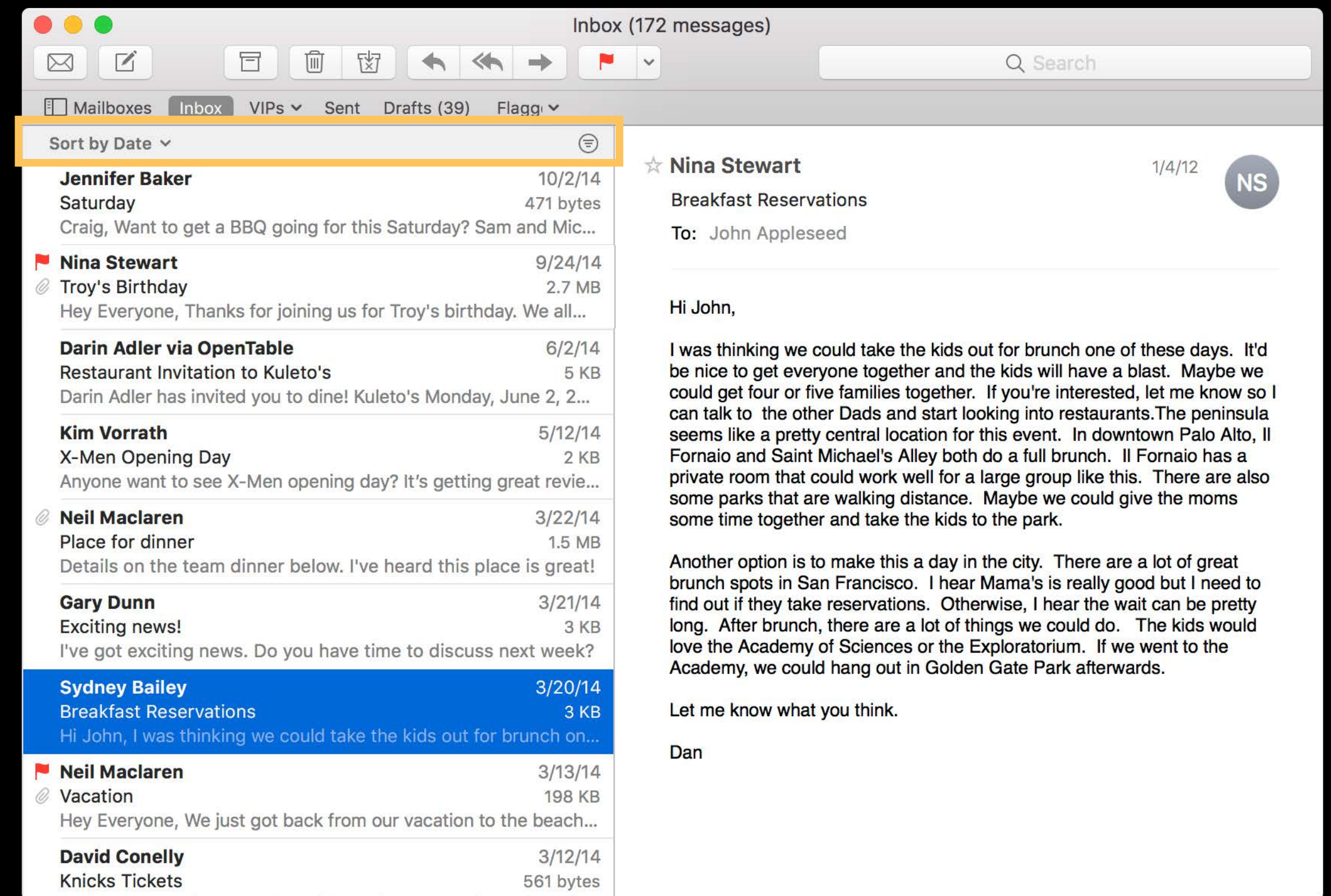
# Mail: Message List

Critique use of space

Consider tradeoffs

- Add new way to sort

## NSTableView



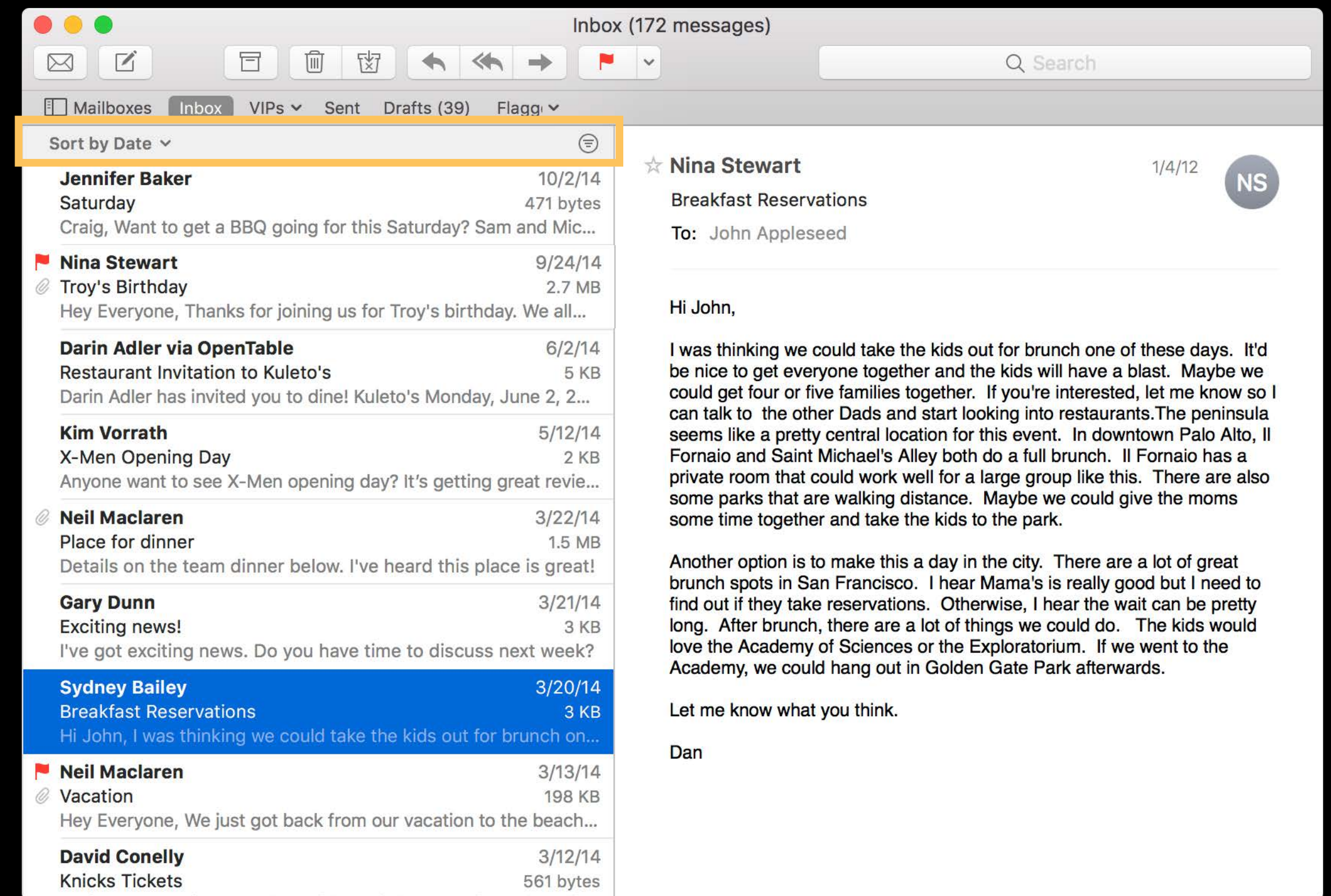
# Mail: Message List

Critique use of space

Consider tradeoffs

- Add new way to sort
- Less control over size of each property

NSTableView





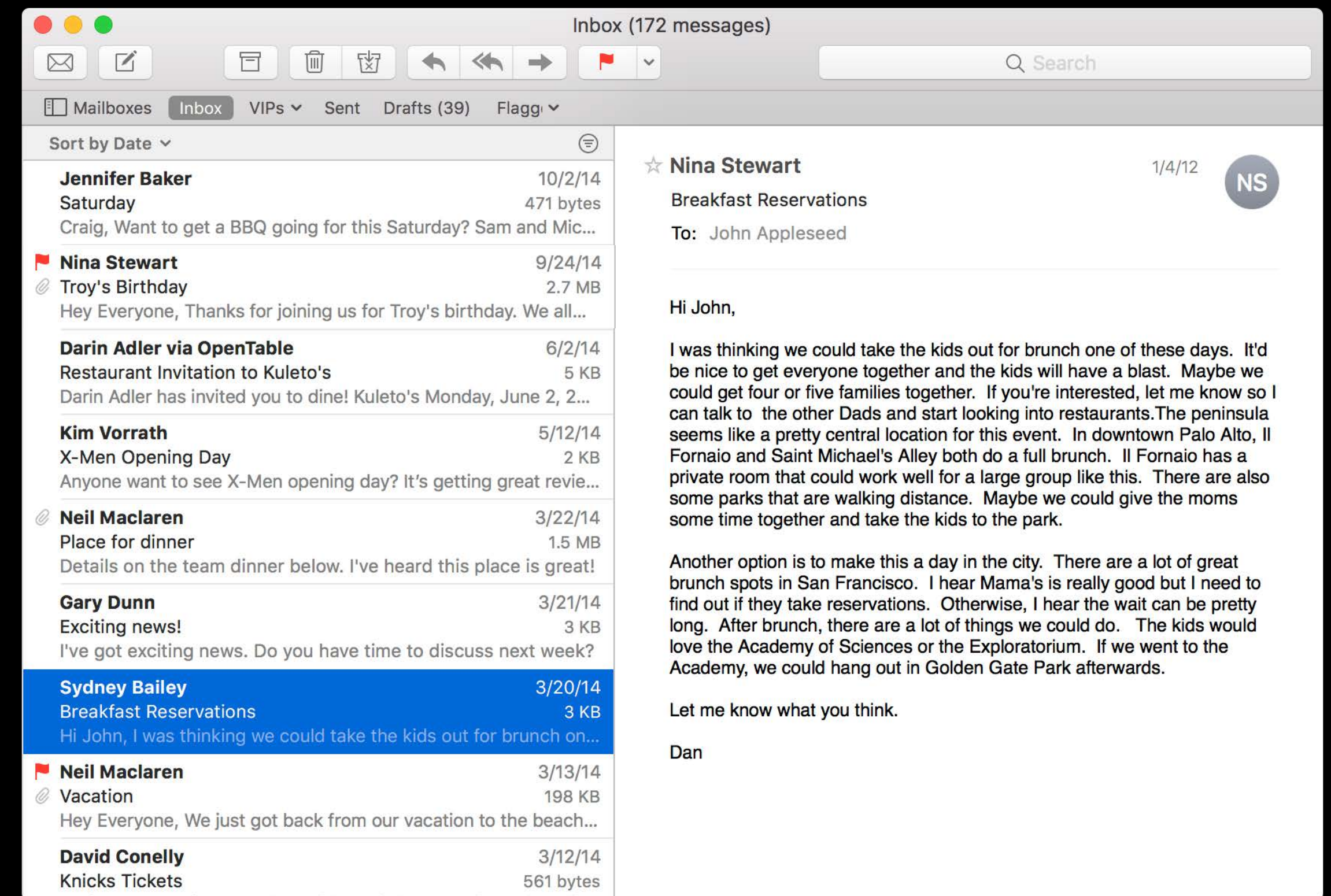
# Mail: Message List

Critique use of space

Consider tradeoffs

- Add new way to sort
- Less control over size of each property
- Emphasizes most used content

## NSTableView

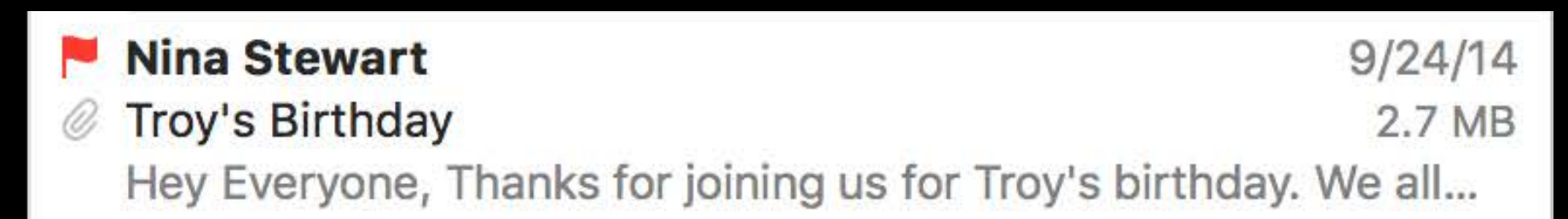


# Mail: Message List

Critique use of space

Consider tradeoffs

- Add new way to sort
- Less control over size of each property
- Emphasizes most used content

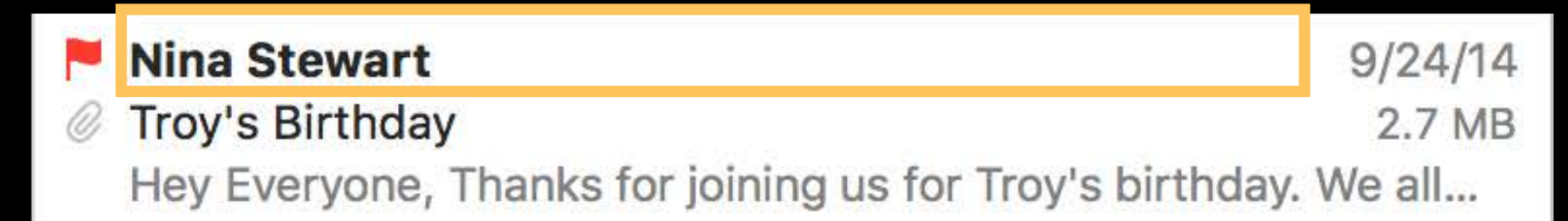


# Mail: Message List

Critique use of space

Consider tradeoffs

- Add new way to sort
- Less control over size of each property
- Emphasizes most used content



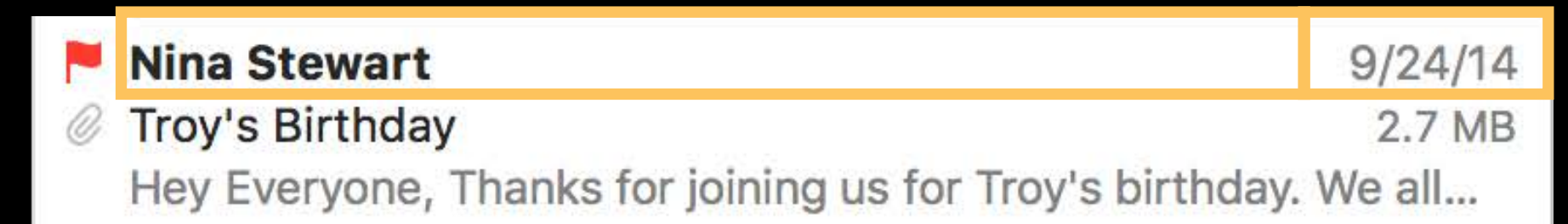
# Mail: Message List

Critique use of space

Consider tradeoffs

- Add new way to sort
- Less control over size of each property
- Emphasizes most used content

NSStackView





# Mail: Message List

Critique use of space

Consider tradeoffs

- Add new way to sort
- Less control over size of each property
- Emphasizes most used content

NSStackView

 <b>Nina Stewart</b>	9/24/14
 Troy's Birthday	2.7 MB
Hey Everyone, Thanks for joining us for Troy's birthday. We all...	



# Mail: Message List

Critique use of space

Consider tradeoffs

- Add new way to sort
- Less control over size of each property
- Emphasizes most used content

NSGridView

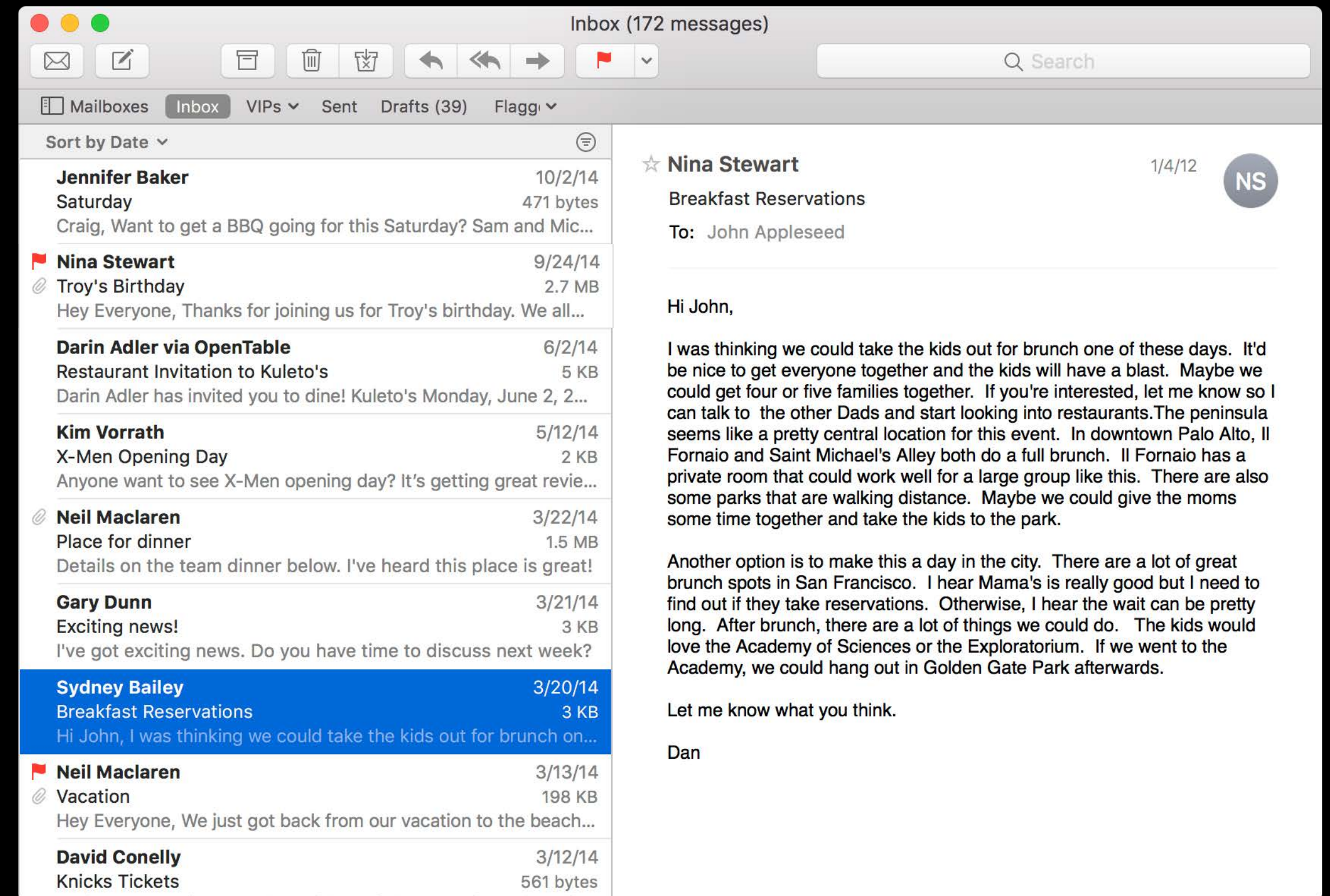
	<b>Nina Stewart</b>	9/24/14
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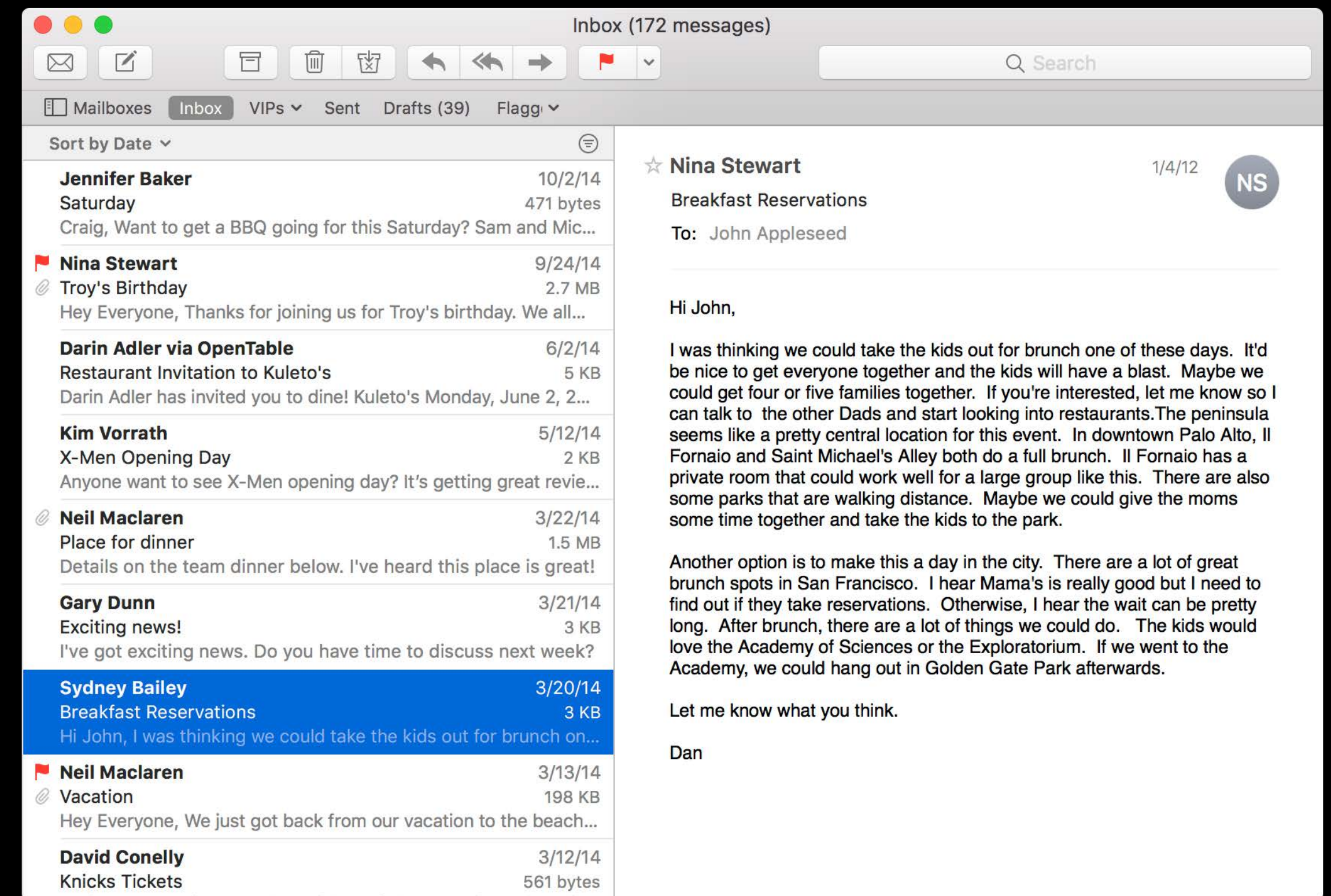
# Mail: Message List

Critique use of space

Consider tradeoffs

- Add new way to sort
- Less control over size of each property
- Emphasizes most used content

## NSTableView





# Preview: Sidebar

usc26@115-30.pdf (page 1 of 6,548)

usc26@115-30.pdf

(Release Point 115-30)

**TITLE 26—INTERNAL REVENUE CODE**

ACT AUG. 16, 1954, CH. 736, 68A STAT. 3

The following tables have been prepared as aids in comparing provisions of the Internal Revenue Code of 1954 (redesignated the Internal Revenue Code of 1986 by Pub. L. 99-514, §2, Oct. 22, 1986, 100 Stat. 2095) with provisions of the Internal Revenue Code of 1939. No inferences, implications, or presumptions of legislative construction or intent are to be drawn or made by reason of such tables. Citations to "R.A." refer to the sections of earlier Revenue Acts.

TABLE I

1939 Code section number	1986 Code section number
1	Omitted
2	7806(a)
3, 4	Omitted
11	1
12(a), (b)(1), (2)	Omitted
12(b)(3), (c)	1
12(d)	2
12(e)	Omitted
12(f)	1
12(g), 13(a)	Omitted
13(b)	11
13(c)-(f), 14	Omitted
15(a), (b)	11
15(c)	1551
21	63
22(a)	61
22(b)(1)	101
22(b)(2)(A)	72
22(b)(2)(B)	72, 403
22(b)(2)(C)	72
22(b)(3)-(5)	102-104
22(b)(6)	107
22(b)(7)	894
22(b)(8)	115, 526, 892, 893, 911, 912, 933, 943
22(b)(9), (10)	108
22(b)(11)-(14)	109, 111-113
22(b)(15)	621
22(b)(16), (17)	114, 121
22(c)	471
22(d)(1)-(5)	472
22(d)(6)	1321, 6155(a)
22(e)	301(a)
22(f)	1001
22(g)	861, 862, 863, 864

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22(d)(6)	1321, 6155(a)
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usc26@115-30.pdf (page 1 of 6,548)

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12(f)	1
12(g), 13(a)	Omitted
13(b)	11
13(c)-(f), 14	Omitted
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22(b)(1)	101
22(b)(2)(A)	72
22(b)(2)(B)	72, 403
22(b)(2)(C)	72
22(b)(3)-(5)	102-104
22(b)(6)	107
22(b)(7)	894

1939 Code section number	1986 Code section number
22(b)	Chapter 1, Subchapter G, Part III
22(c)	Omitted
22(d)	76
22(e)	71
22(f)	691
22(g)	73, 6201(e)
22(h)	62
22(i)	75
23	161, 211
23(a)(1)(A), (B)	162
23(a)(1)(C)	263
23(a)(2)	212
23(b)	163, 265
23(c)(1)	164
23(c)(2)	Omitted

# Preview: Sidebar

NSStackView

NSGridView

NSCollectionView

NSTableView

NSOutlineView

NSBrowser

# Preview: Sidebar

Large number of pages

Selectable

Reorderable

NSStackView

NSGridView

NSCollectionView

NSTableView

NSOutlineView

NSBrowser

# Preview: Sidebar

Large number of pages

Selectable

Reorderable

~~NSStackView~~

~~NSGridView~~

NSCollectionView

NSTableView

NSOutlineView

NSBrowser

# Preview: Sidebar

Large number of pages

~~NSStackView~~

Selectable

~~NSGridView~~

Reorderable

NSCollectionView

Vertical layout

NSTableView

NSOutlineView

NSBrowser

# Preview: Sidebar

Large number of pages

~~NSStackView~~

Selectable

~~NSGridView~~

Reorderable

NSCollectionView

Vertical layout

NSTableView

NSOutlineView

~~NSBrowser~~

# Preview: Sidebar

~~NSStackView~~

~~NSGridView~~

NSCollectionView

NSTableView

NSOutlineView

~~NSBrowser~~



# Preview: Sidebar

Need collapsable categories

~~NSStackView~~

~~NSGridView~~

NSCollectionView

NSTableView

NSOutlineView

~~NSBrowser~~

# Preview: Sidebar

Need collapsable categories

▼ usc26@115-30.pdf

~~NSStackView~~

~~NSGridView~~

NSCollectionView

NSTableView

NSOutlineView

~~NSBrowser~~

# Preview: Sidebar

Need collapsable categories

▼ usc26@115-30.pdf

~~NSStackView~~

~~NSGridView~~

NSCollectionView

~~NSTableView~~

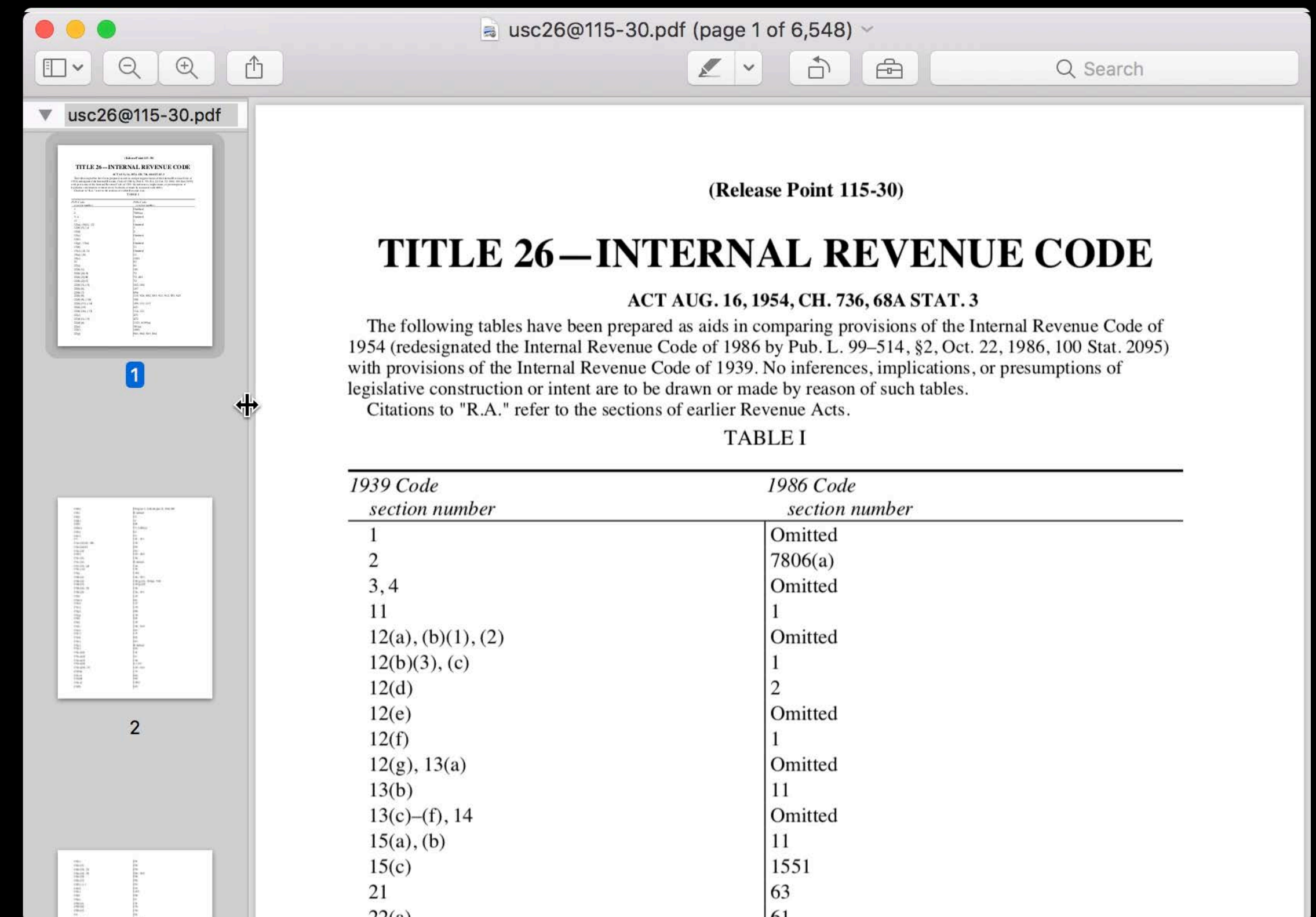
NSOutlineView

~~NSBrowser~~

# Preview: Sidebar

Need collapsible categories

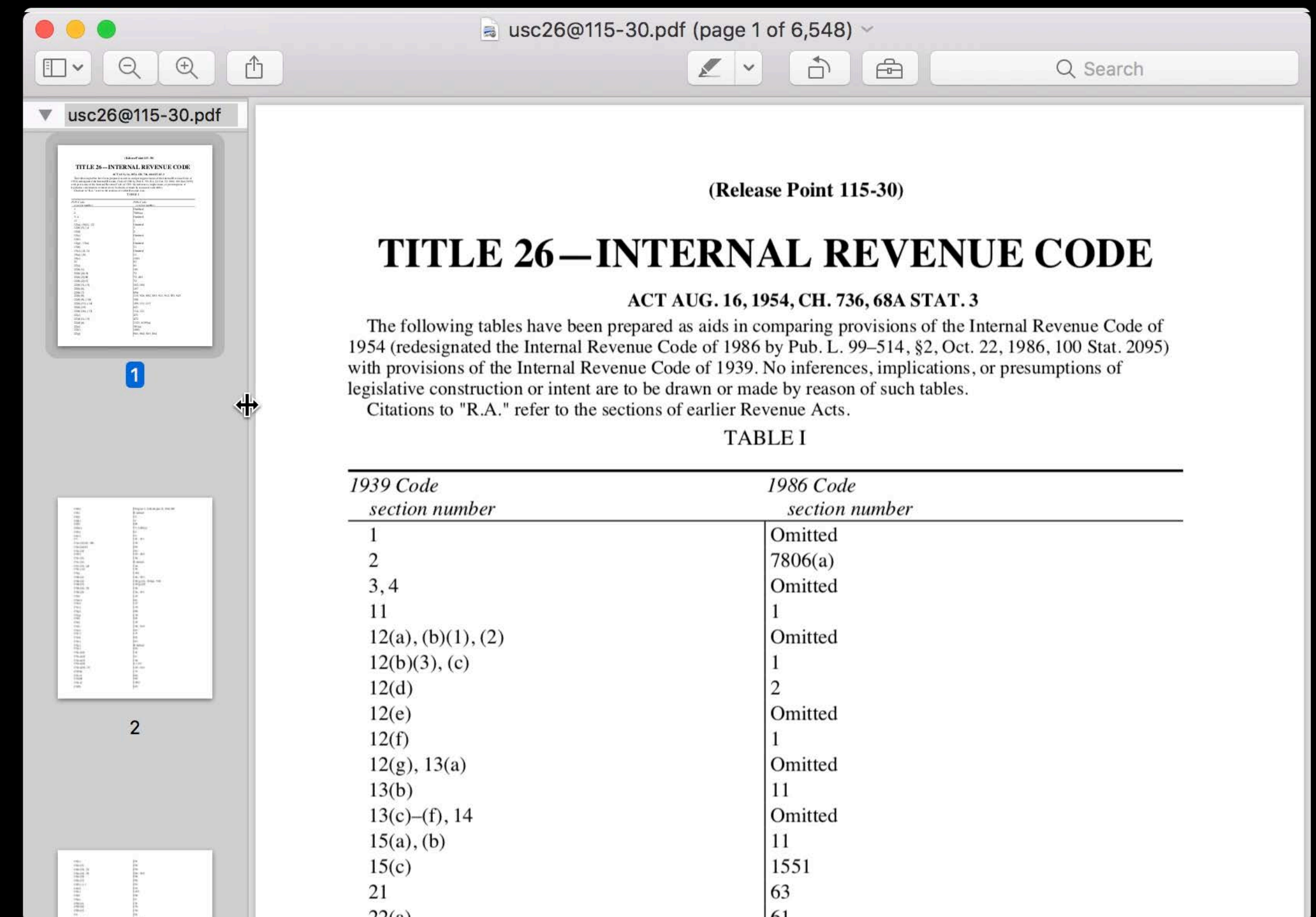
NSOutlineView or NSCollectionView



# Preview: Sidebar

Need collapsible categories

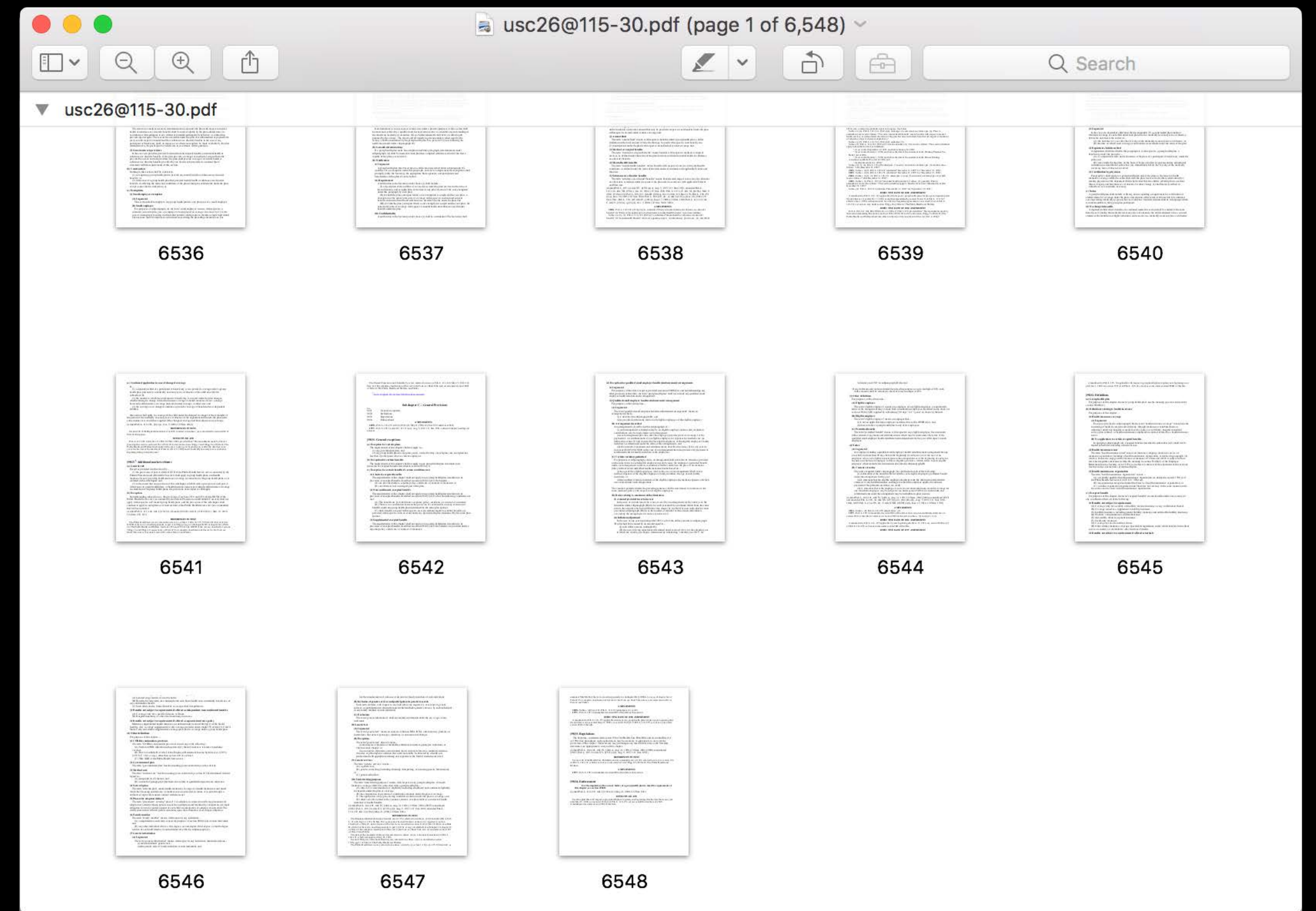
NSOutlineView or NSCollectionView



# Preview: Sidebar

Need collapsible categories

NSOutlineView or NSCollectionView



# Preview: Sidebar

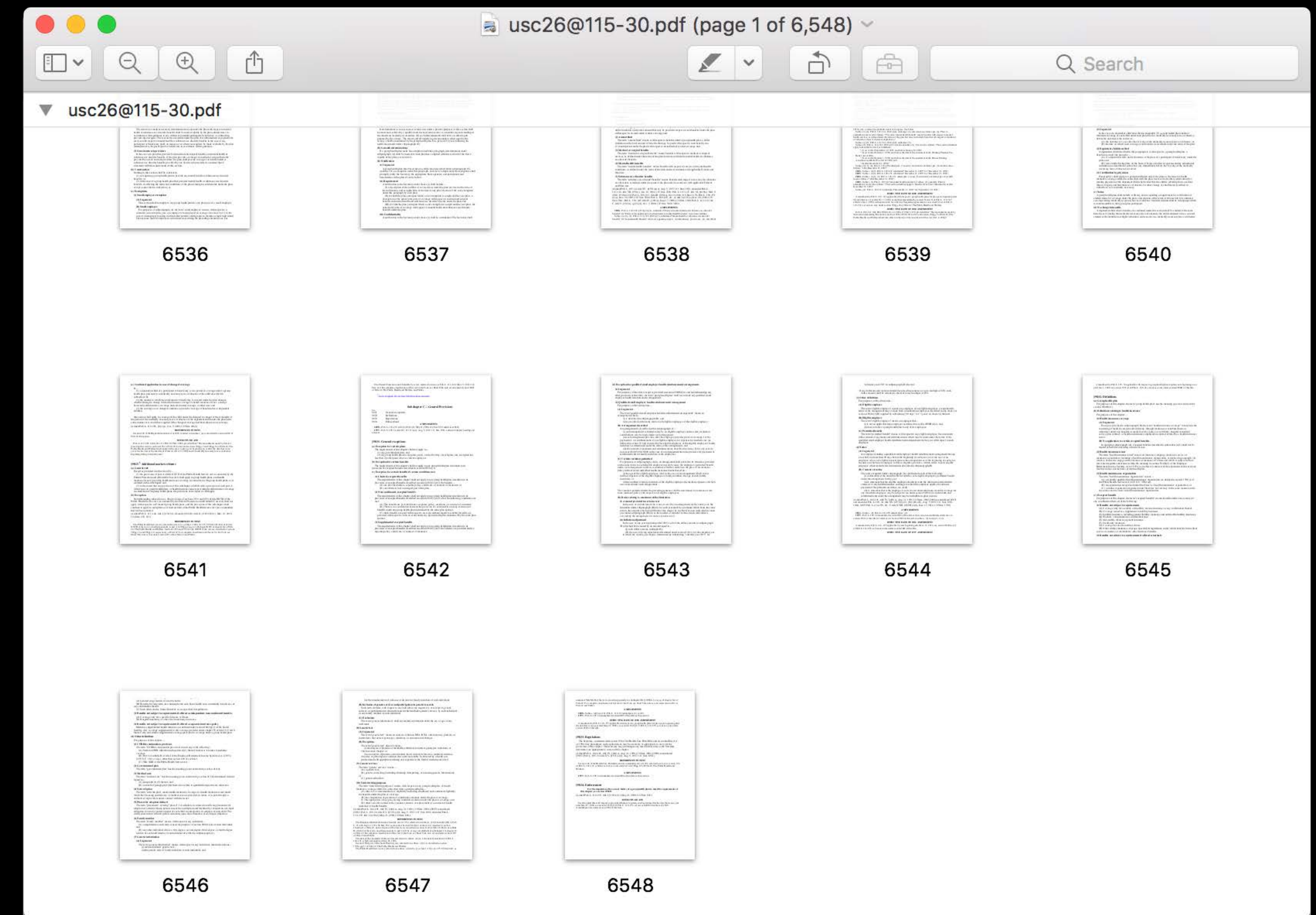
Need collapsible categories

Reusable data source

NSOutlineView

or

NSCollectionView

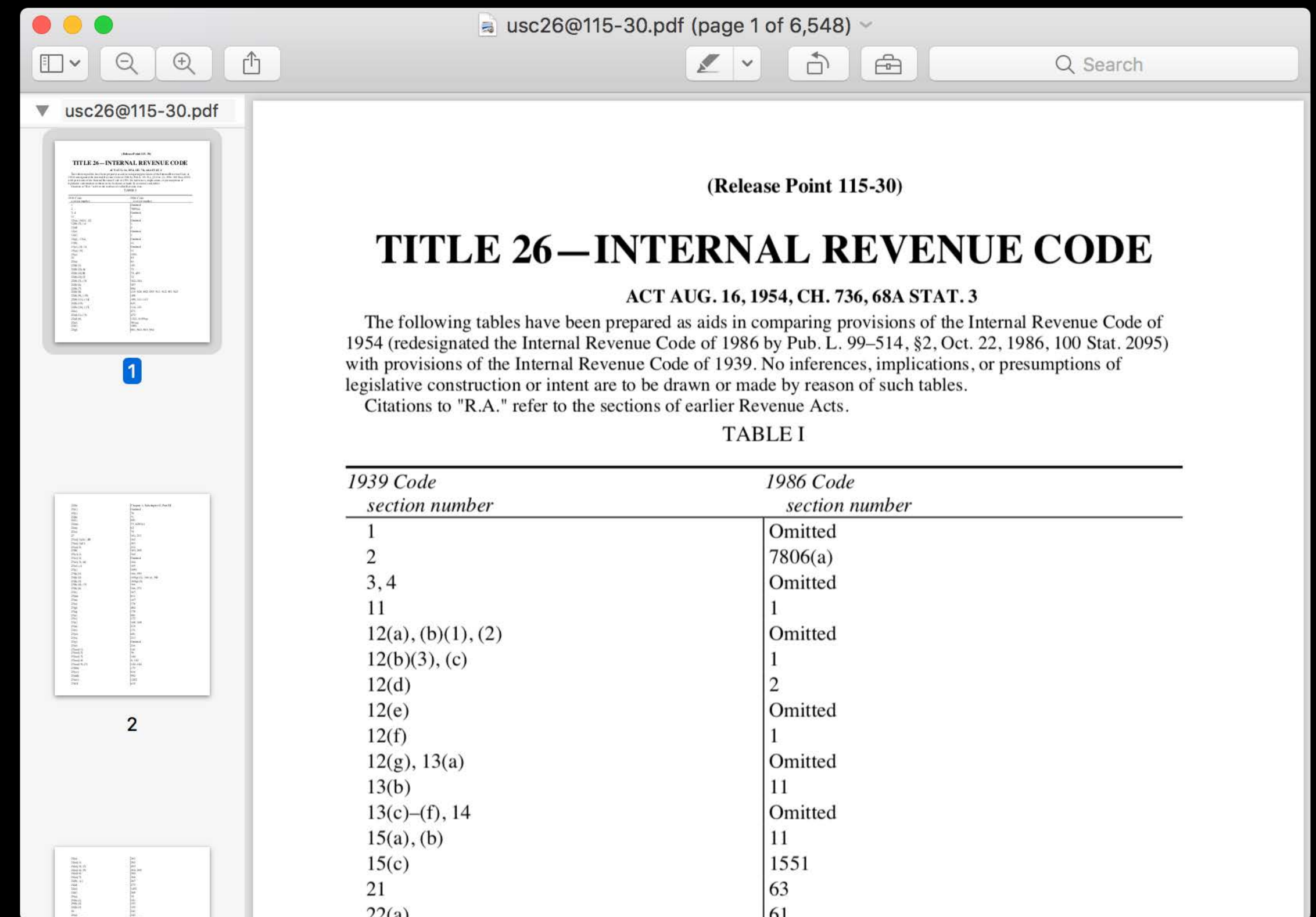


# Preview: Sidebar

Need collapsible categories

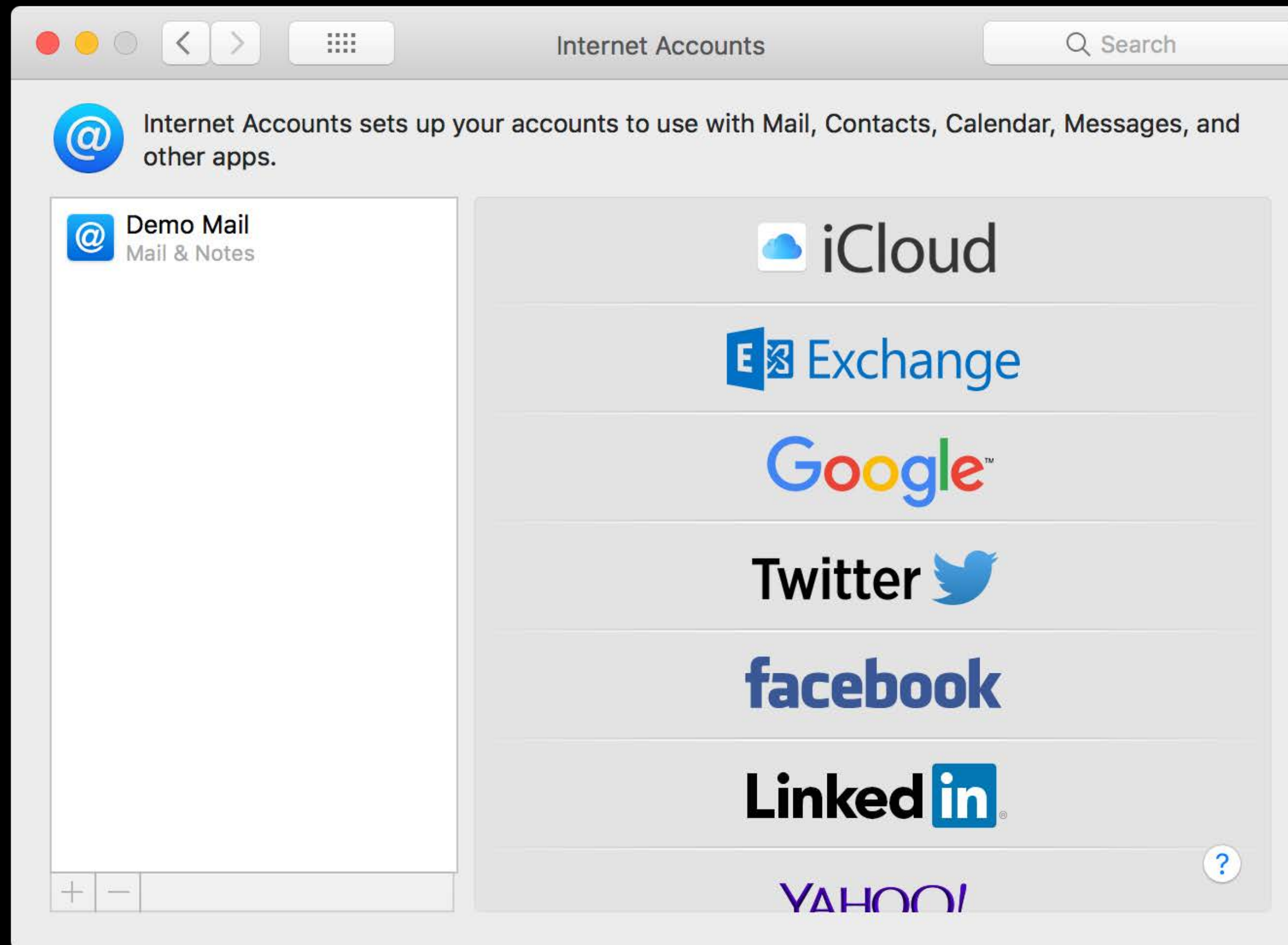
Reusable data source

## NSCollectionView

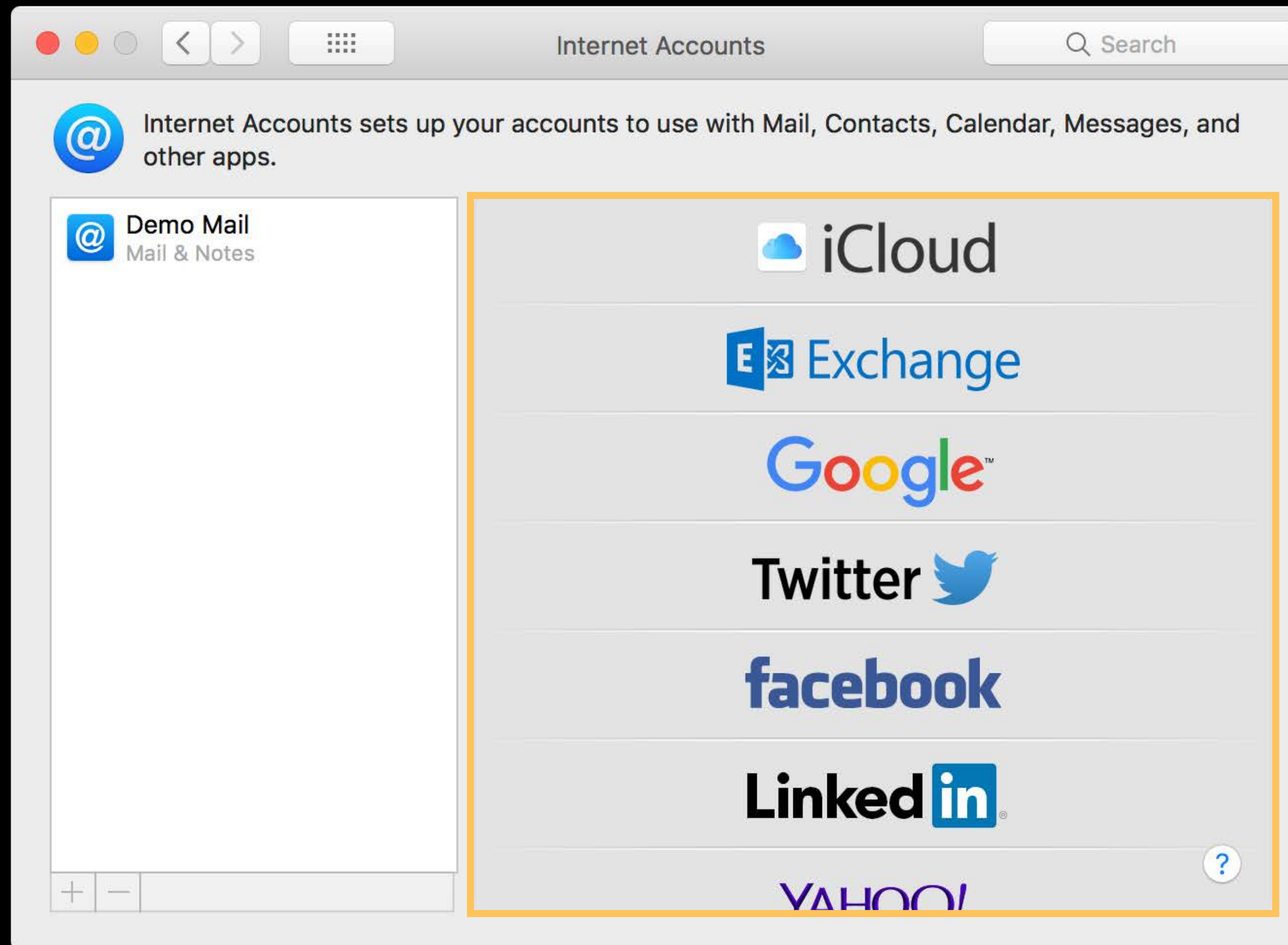




# Internet Accounts: Account Types



# Internet Accounts: Account Types



# Internet Accounts: Account Types

NSStackView

NSGridView

NSCollectionView

NSTableView

NSOutlineView

NSBrowser

# Internet Accounts: Account Types

Small number of account types

One dimensional, vertical layout

NSStackView

NSGridView

NSCollectionView

NSTableView

NSOutlineView

NSBrowser

# Internet Accounts: Account Types

Small number of account types

One dimensional, vertical layout

NSStackView

~~NSGridView~~

~~NSCollectionView~~

NSTableView

~~NSOutlineView~~

~~NSBrowser~~

# Internet Accounts: Account Types

Small number of account types

One dimensional, vertical layout

No selection: each item is a button

NSStackView

~~NSGridView~~

~~NSCollectionView~~

NSTableView

~~NSOutlineView~~

~~NSBrowser~~

# Internet Accounts: Account Types

Small number of account types

One dimensional, vertical layout

No selection: each item is a button

NSStackView

~~NSGridView~~

~~NSCollectionView~~

~~NSTableView~~

~~NSOutlineView~~

~~NSBrowser~~

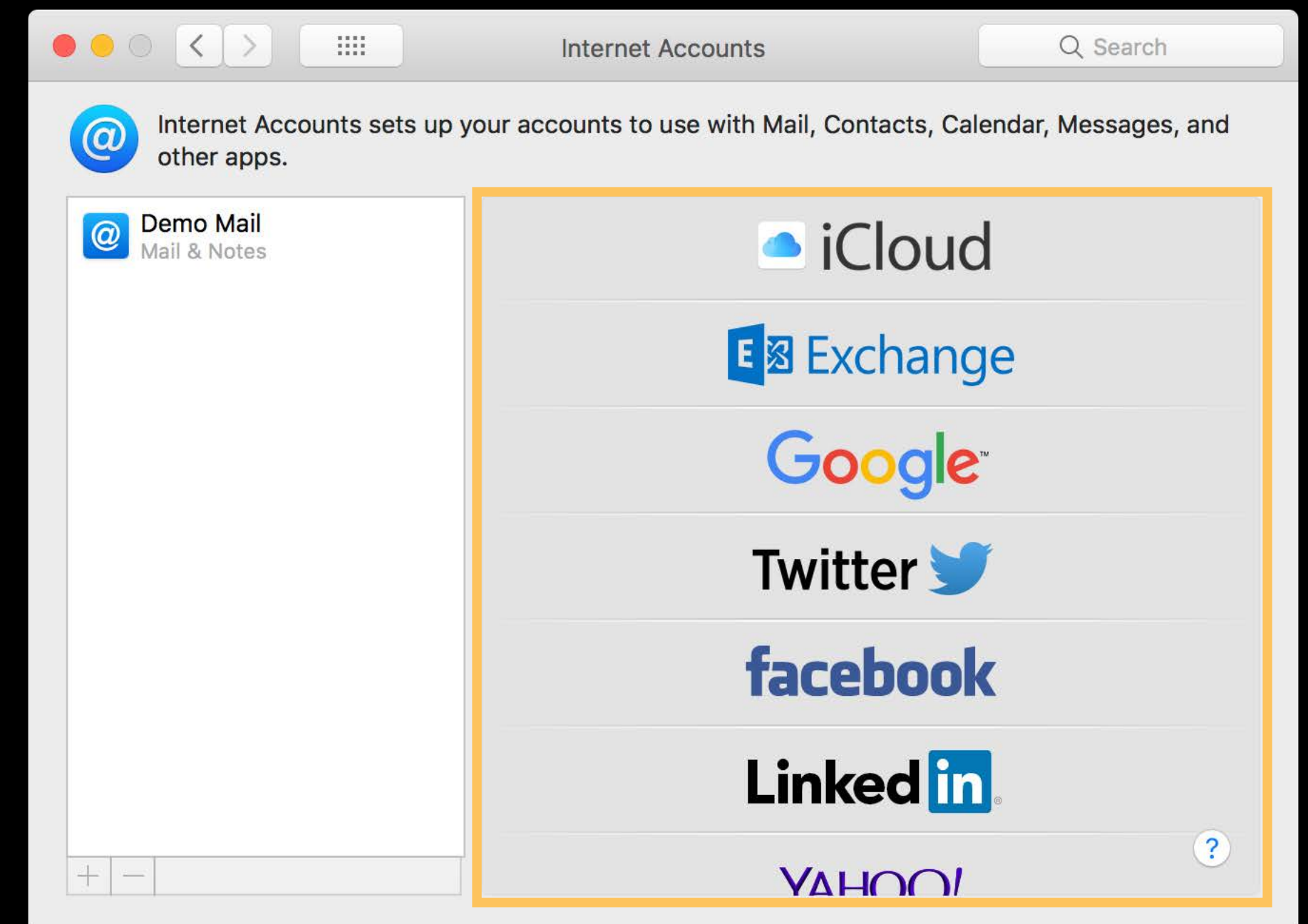
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Small number of account types

One dimensional, vertical layout

No selection: each item is a button

NSStackView





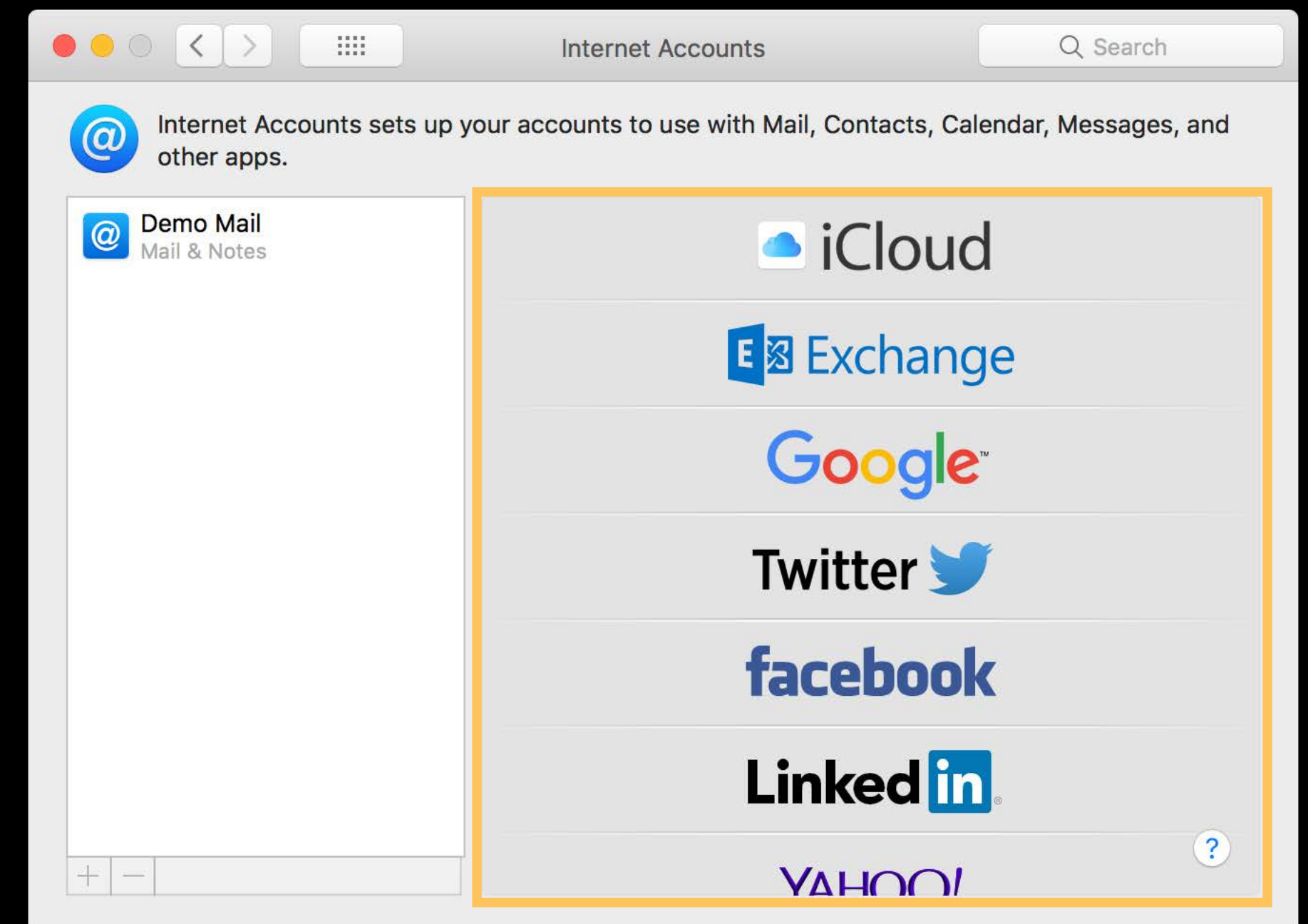
# Internet Accounts: Account Types

Small number of account types

One dimensional, vertical layout

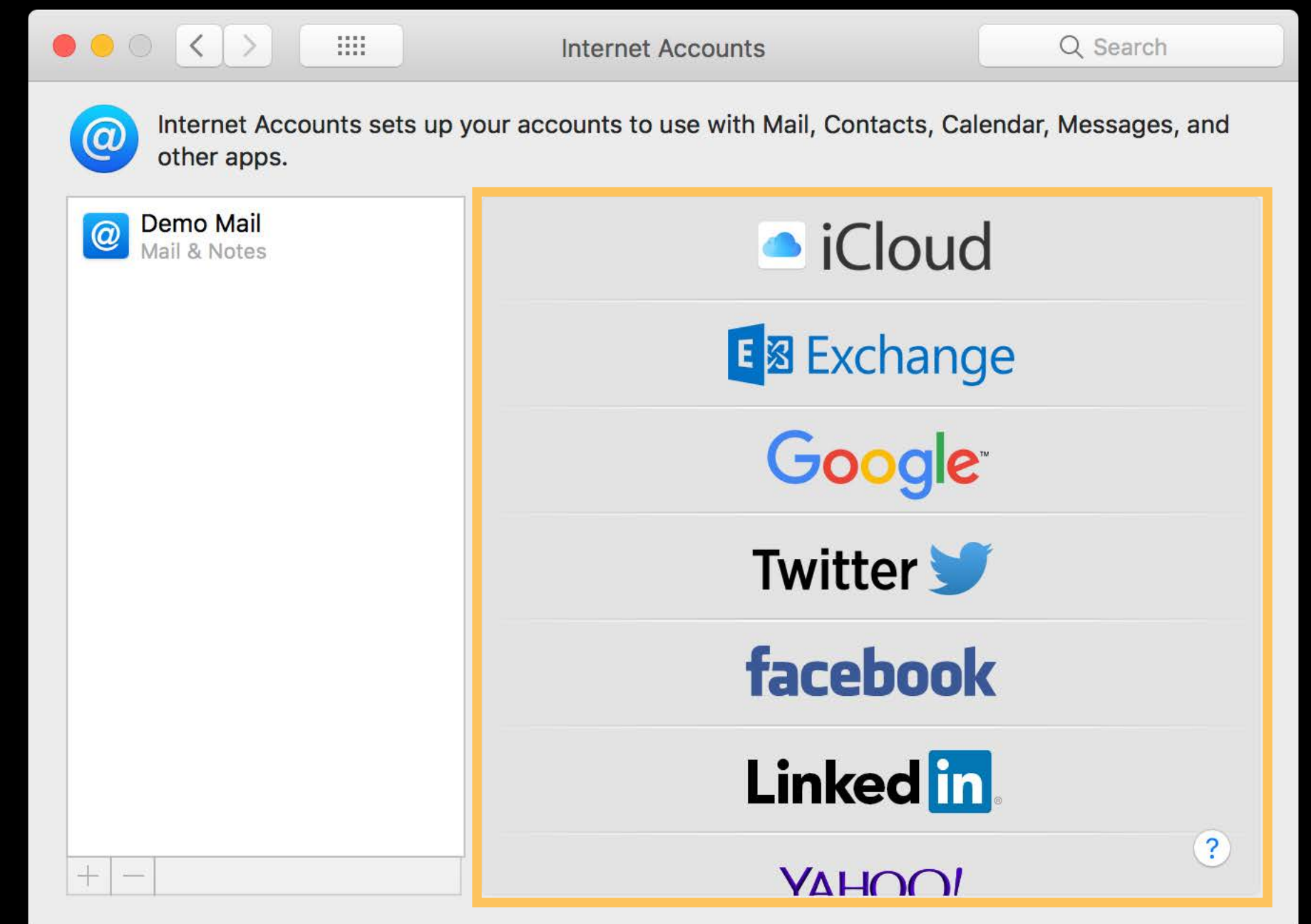
No selection: each item is a button

NSTableView



# Internet Accounts: Account Types

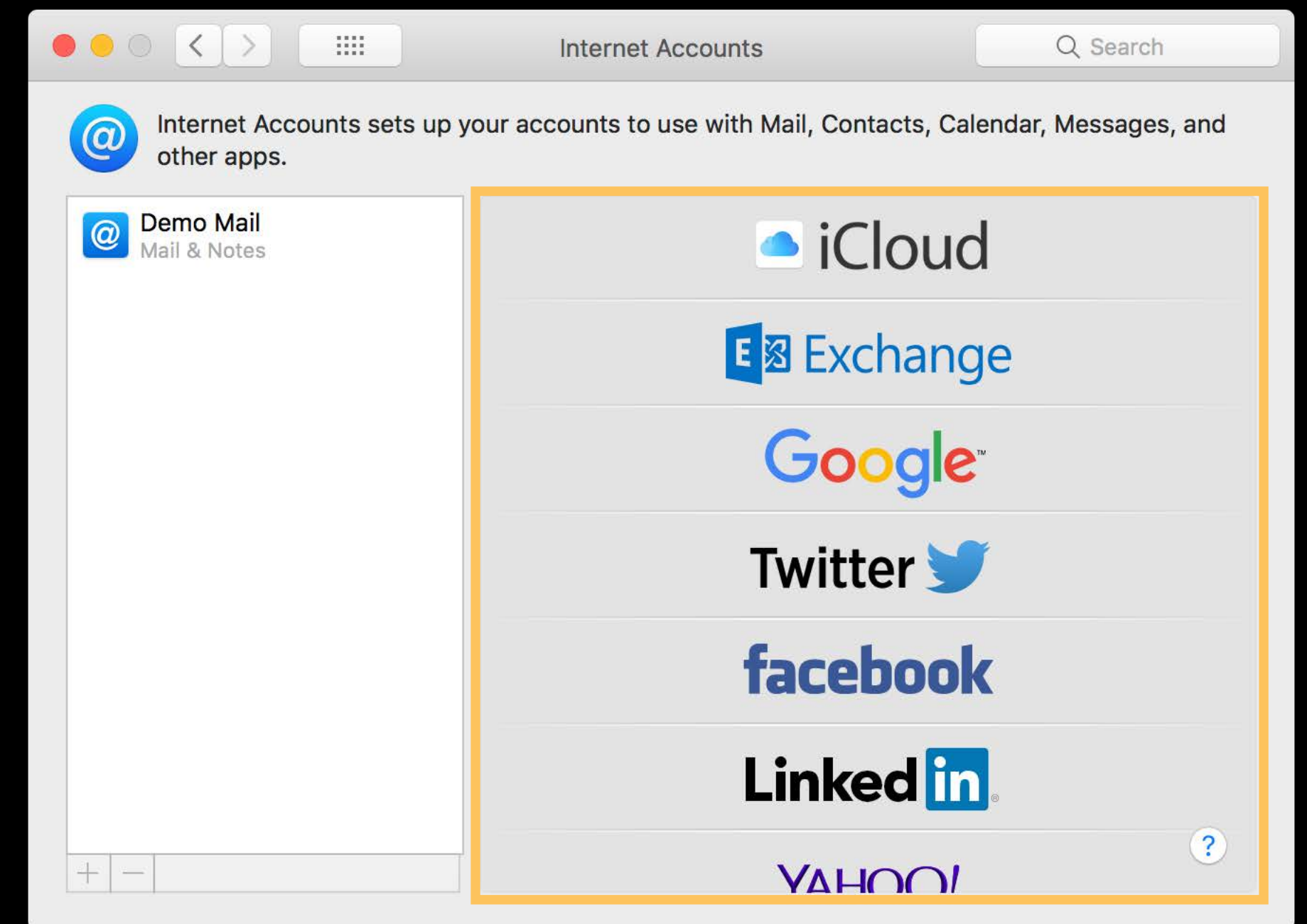
NSTableView



# Internet Accounts: Account Types

Historical

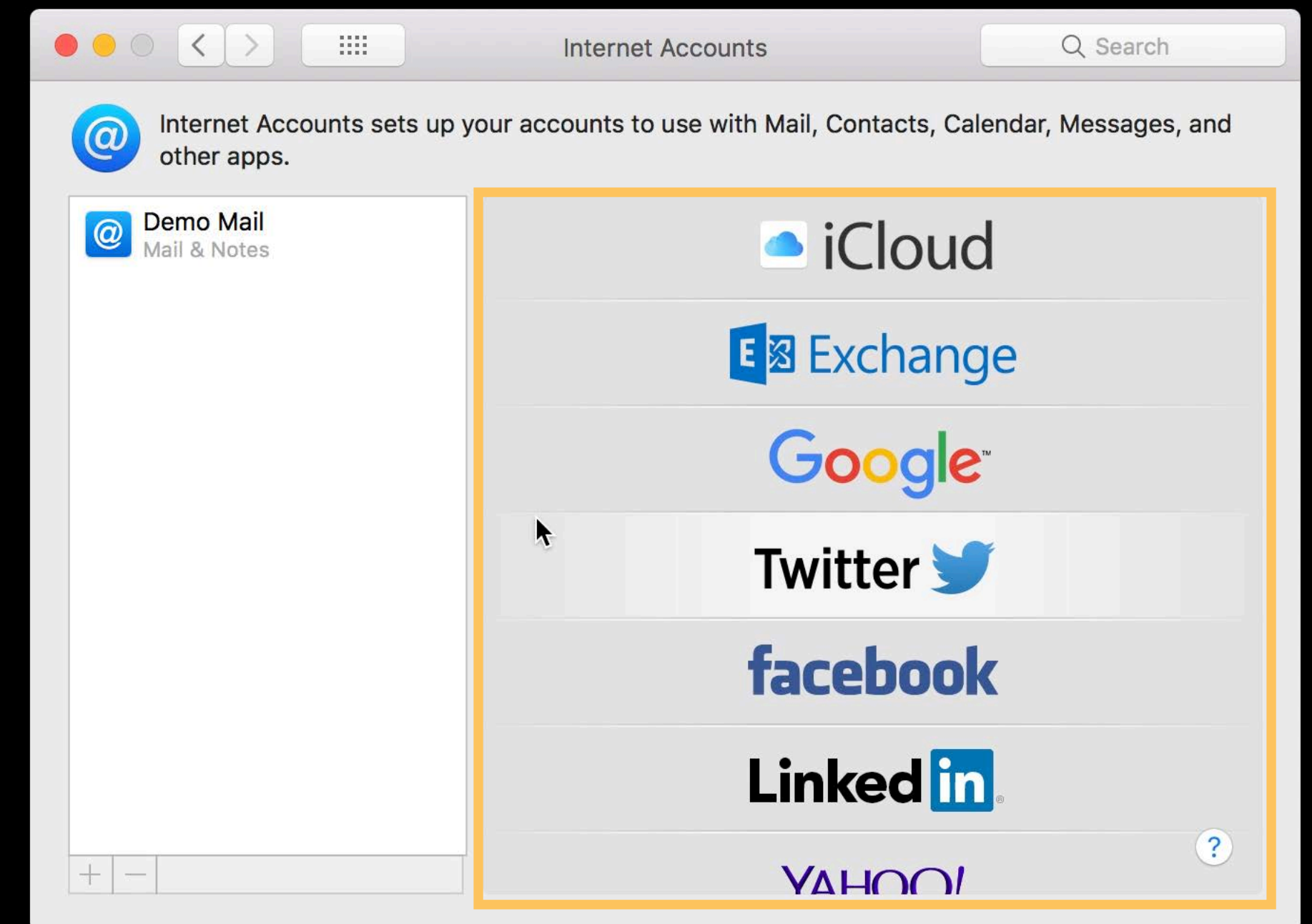
NSTableView



# Internet Accounts: Account Types

Historical

NSTableView

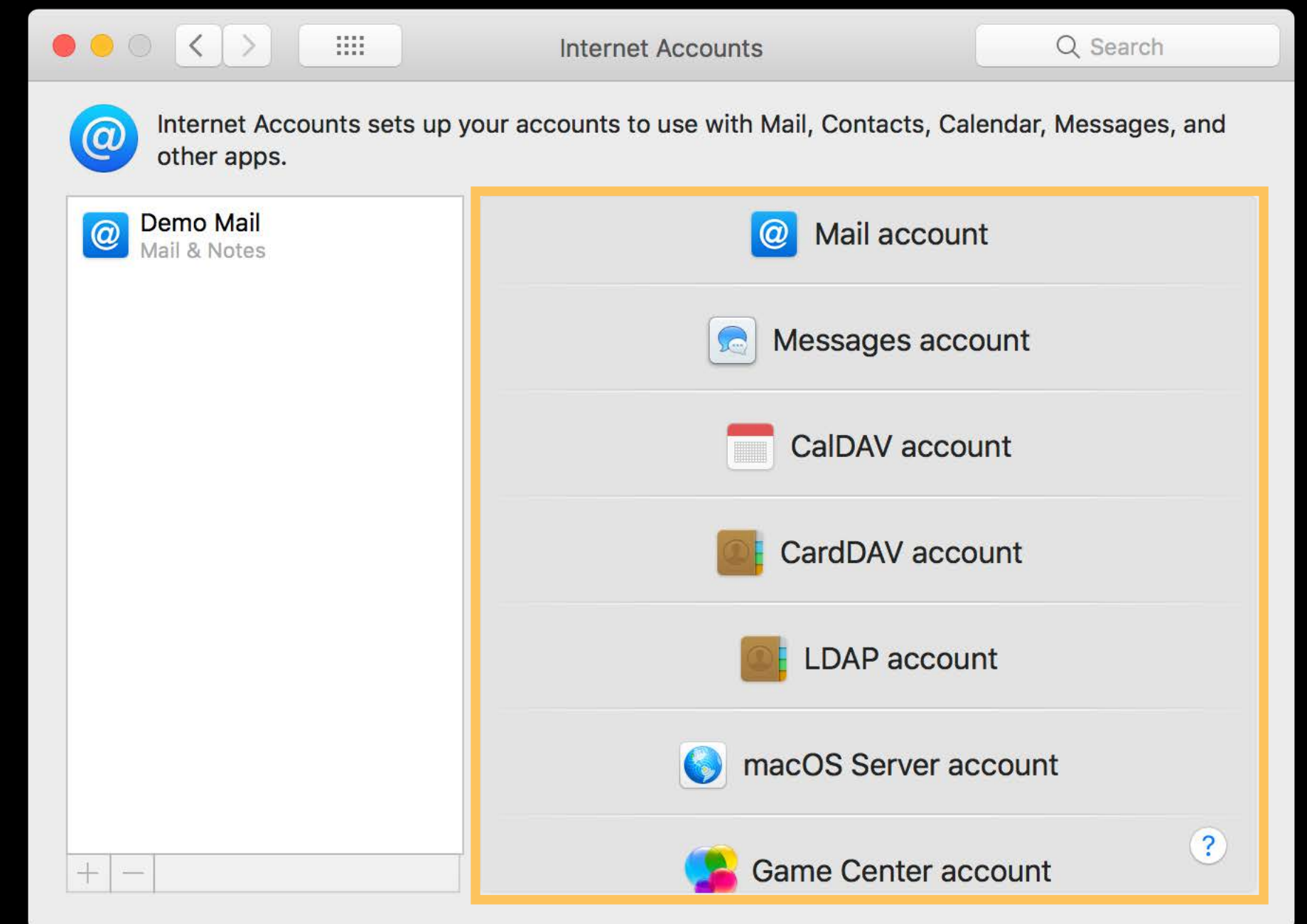


# Internet Accounts: Account Types

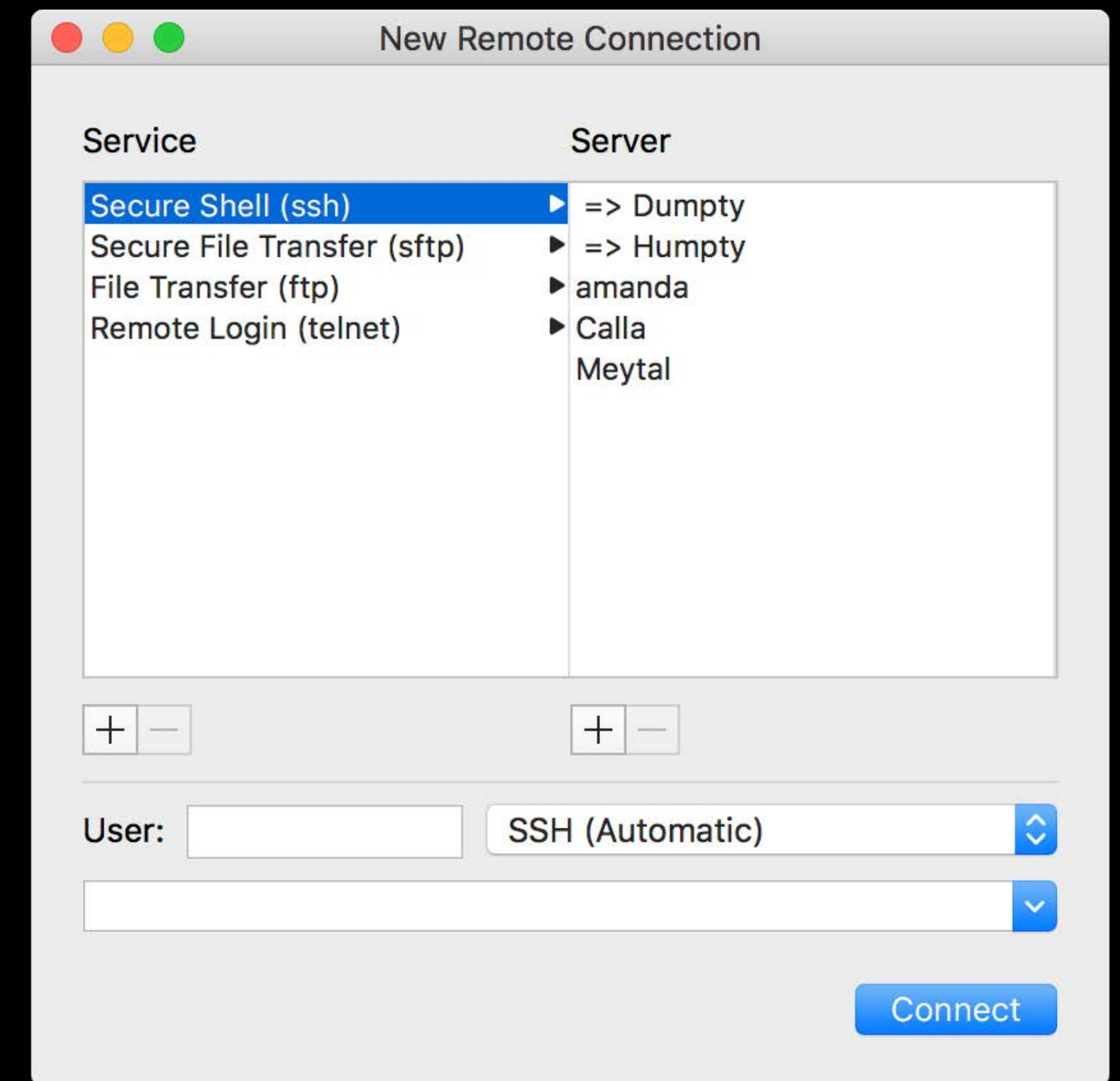
Historical

Dynamic data

NSTableView

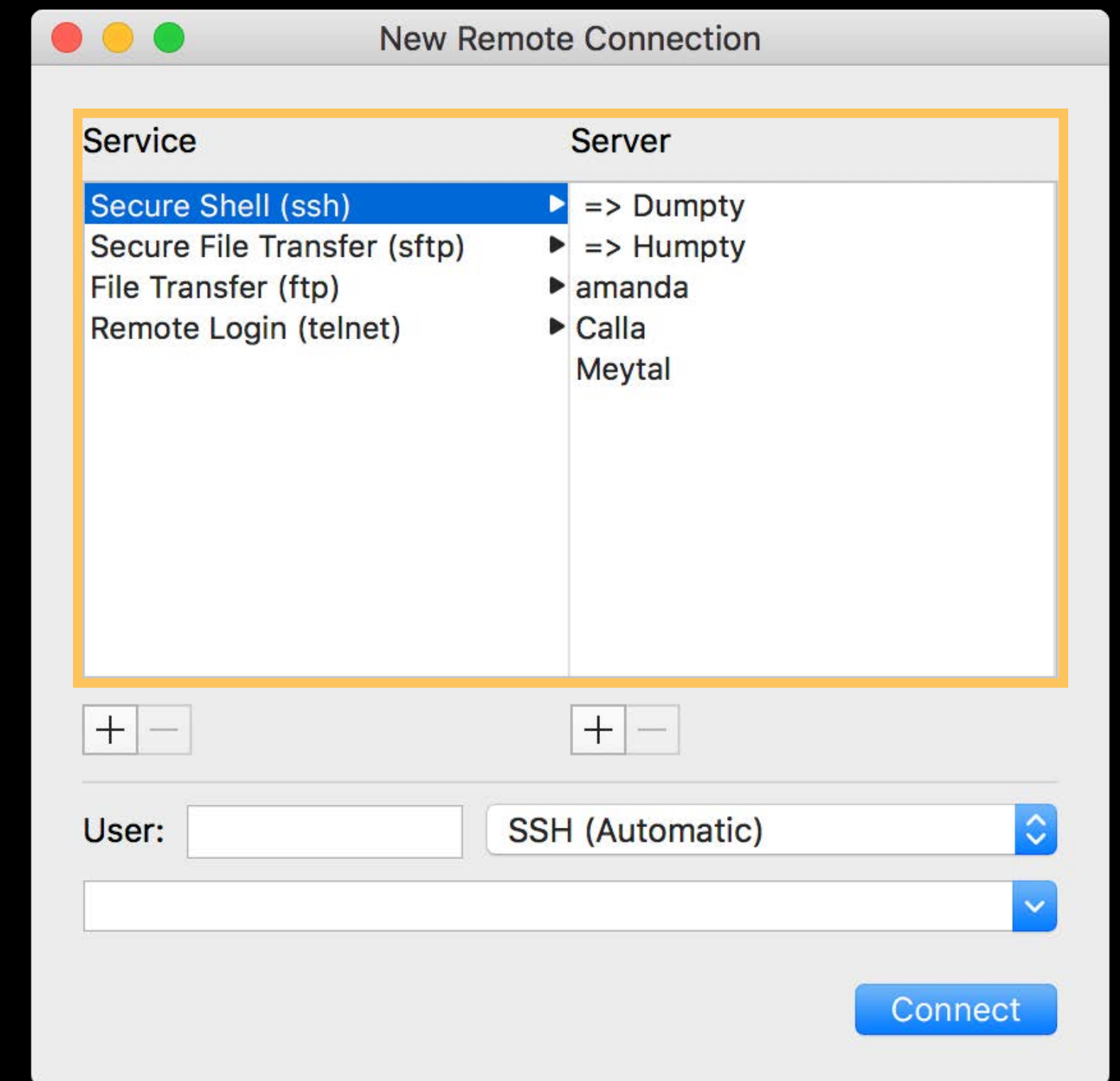


# Terminal: New Remote Connection



# Terminal: New Remote Connection

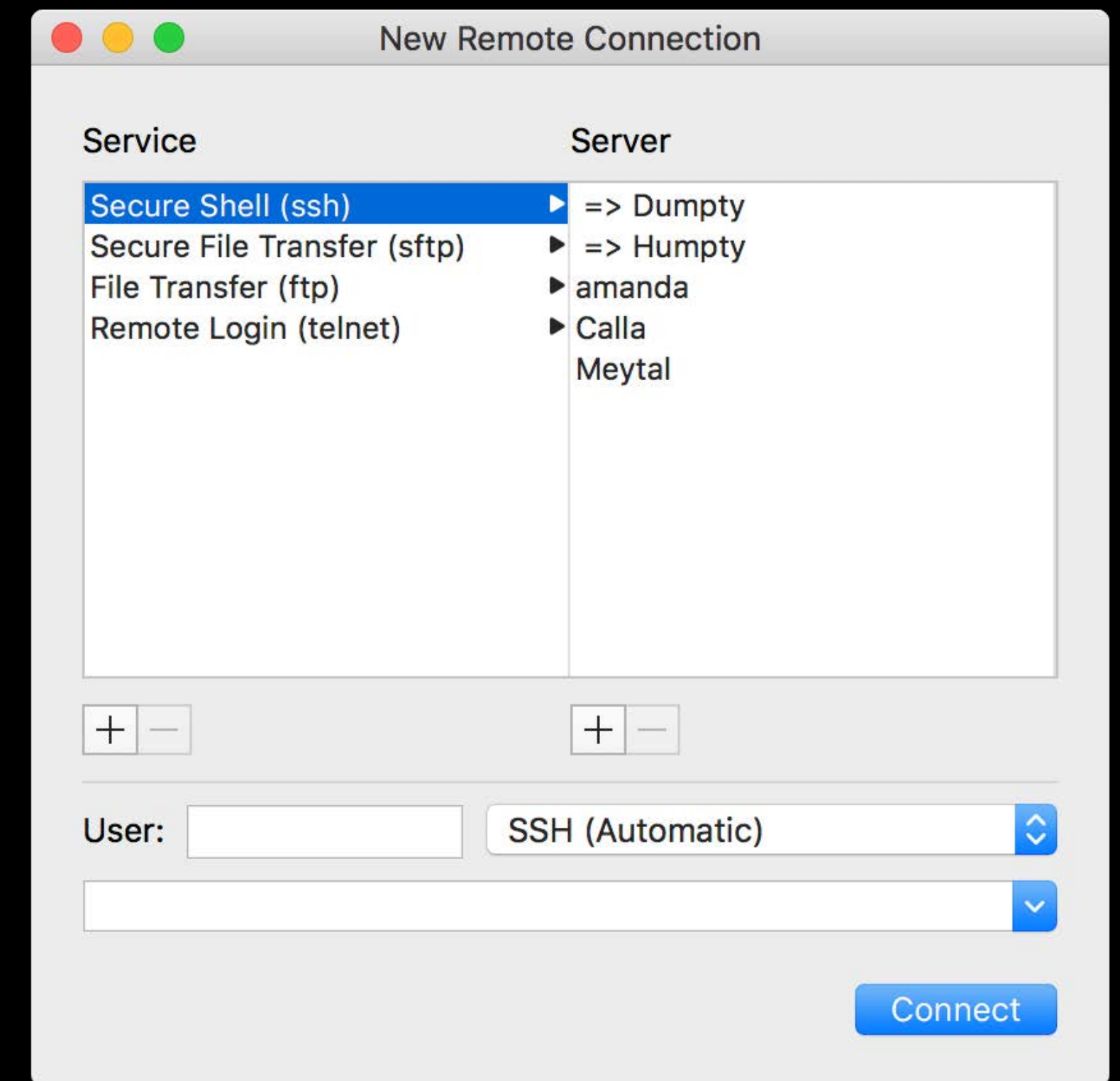
NSBrowser



# Terminal: New Remote Connection

Size and shape of UI

NSBrowser



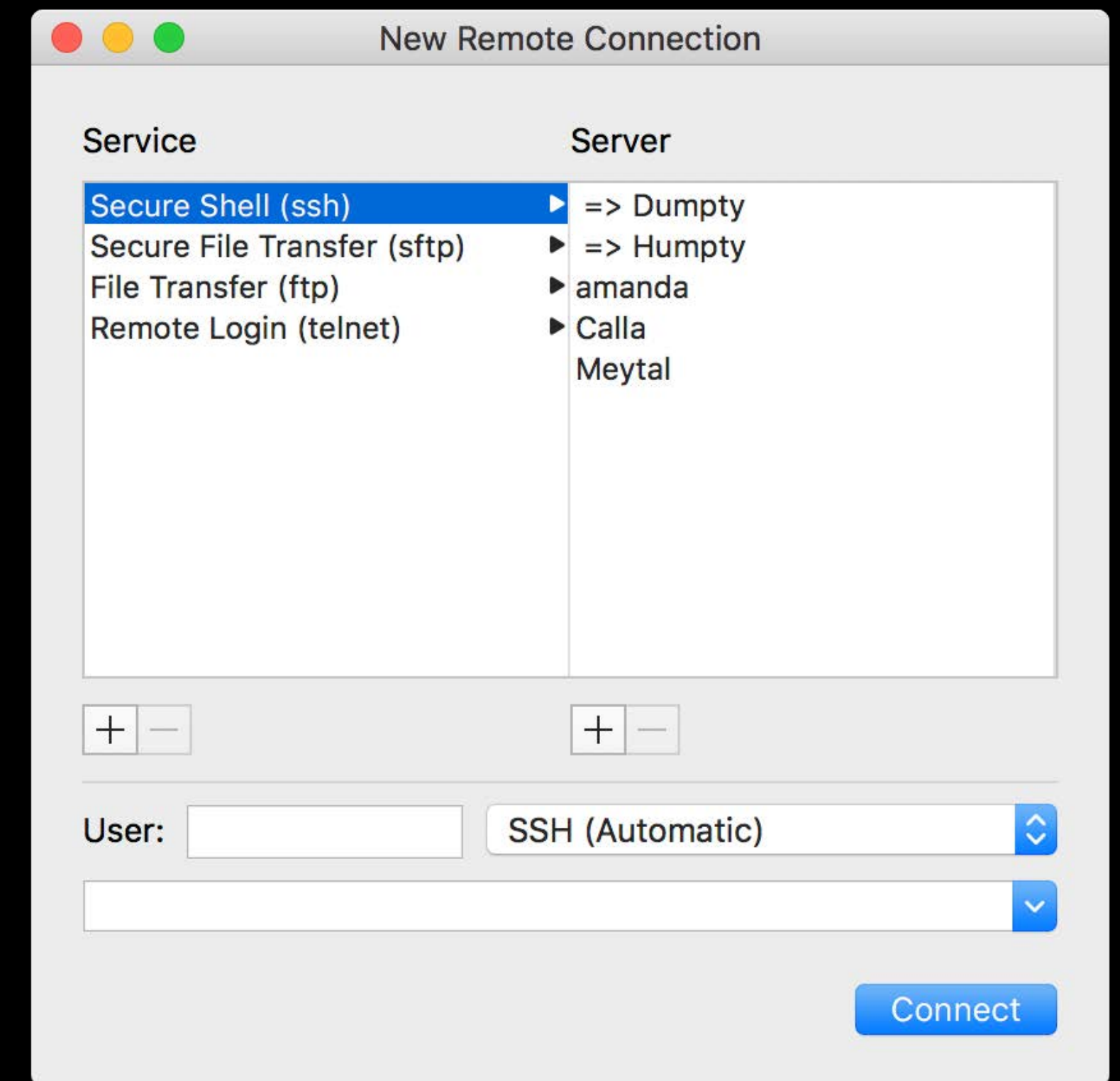


# Terminal: New Remote Connection

Size and shape of UI

Vertical space versus horizontal space

NSBrowser

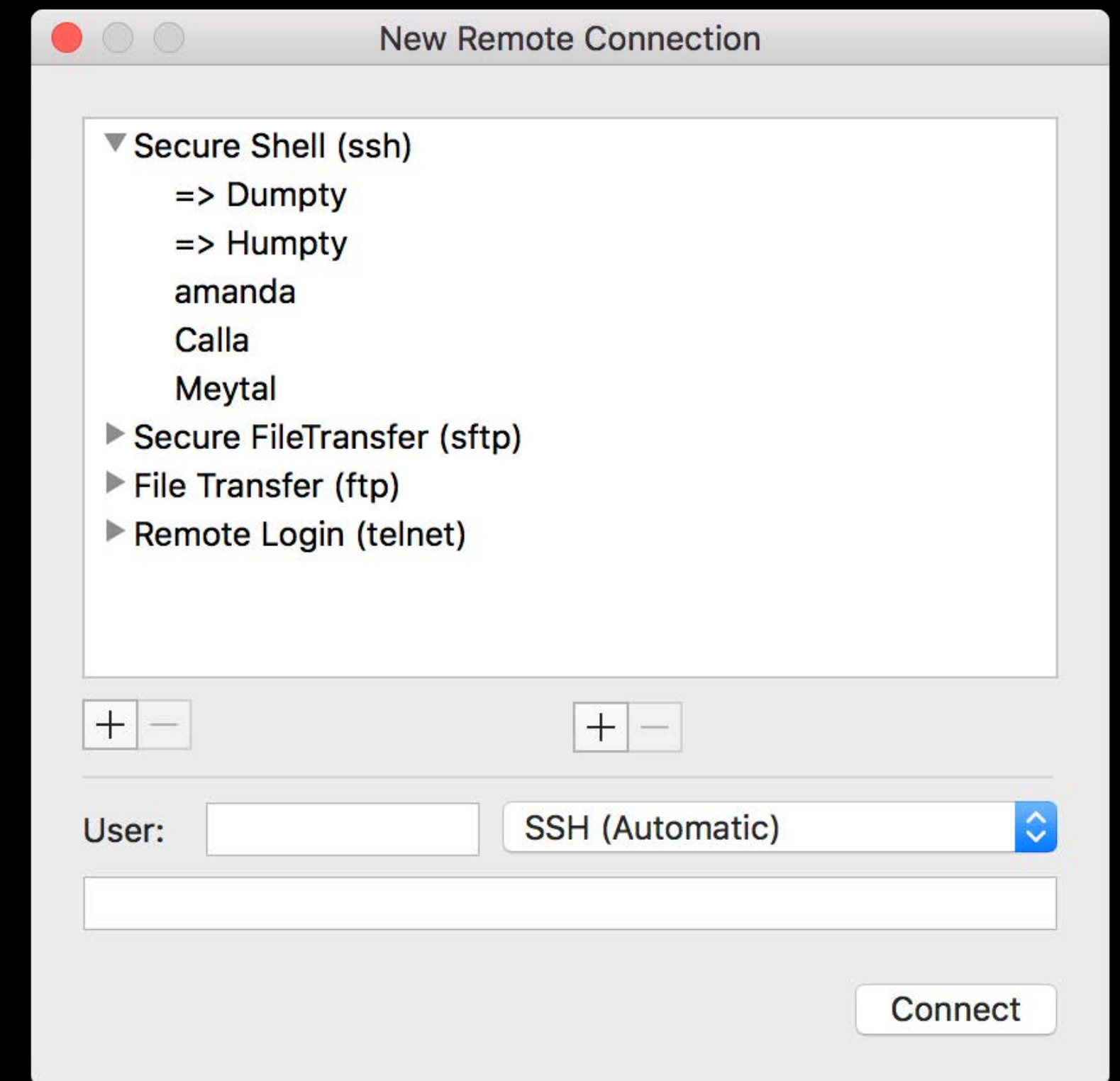


# Terminal: New Remote Connection

Size and shape of UI

Vertical space versus horizontal space

NSOutlineView

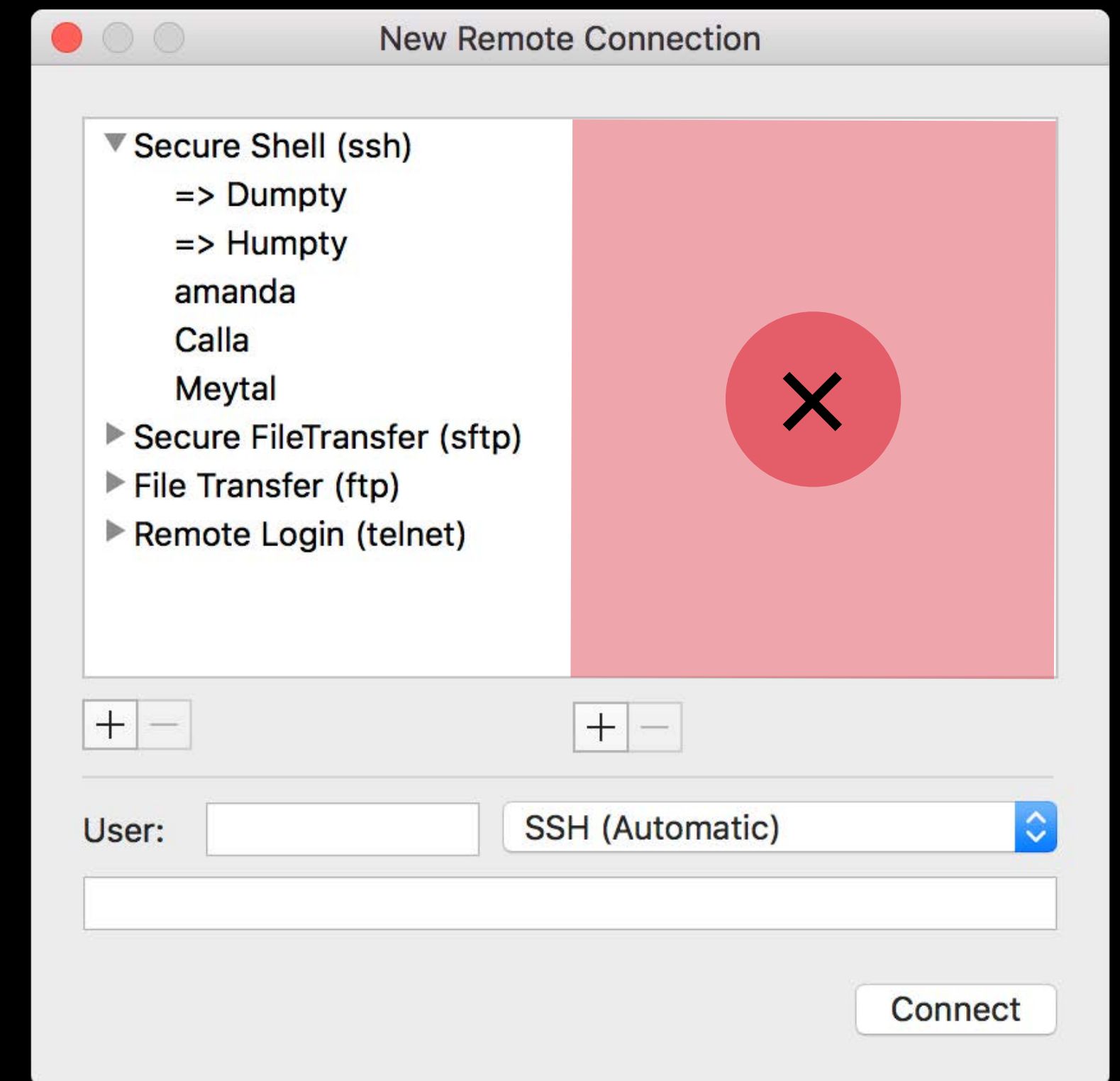


# Terminal: New Remote Connection

Size and shape of UI

Vertical space versus horizontal space

NSOutlineView



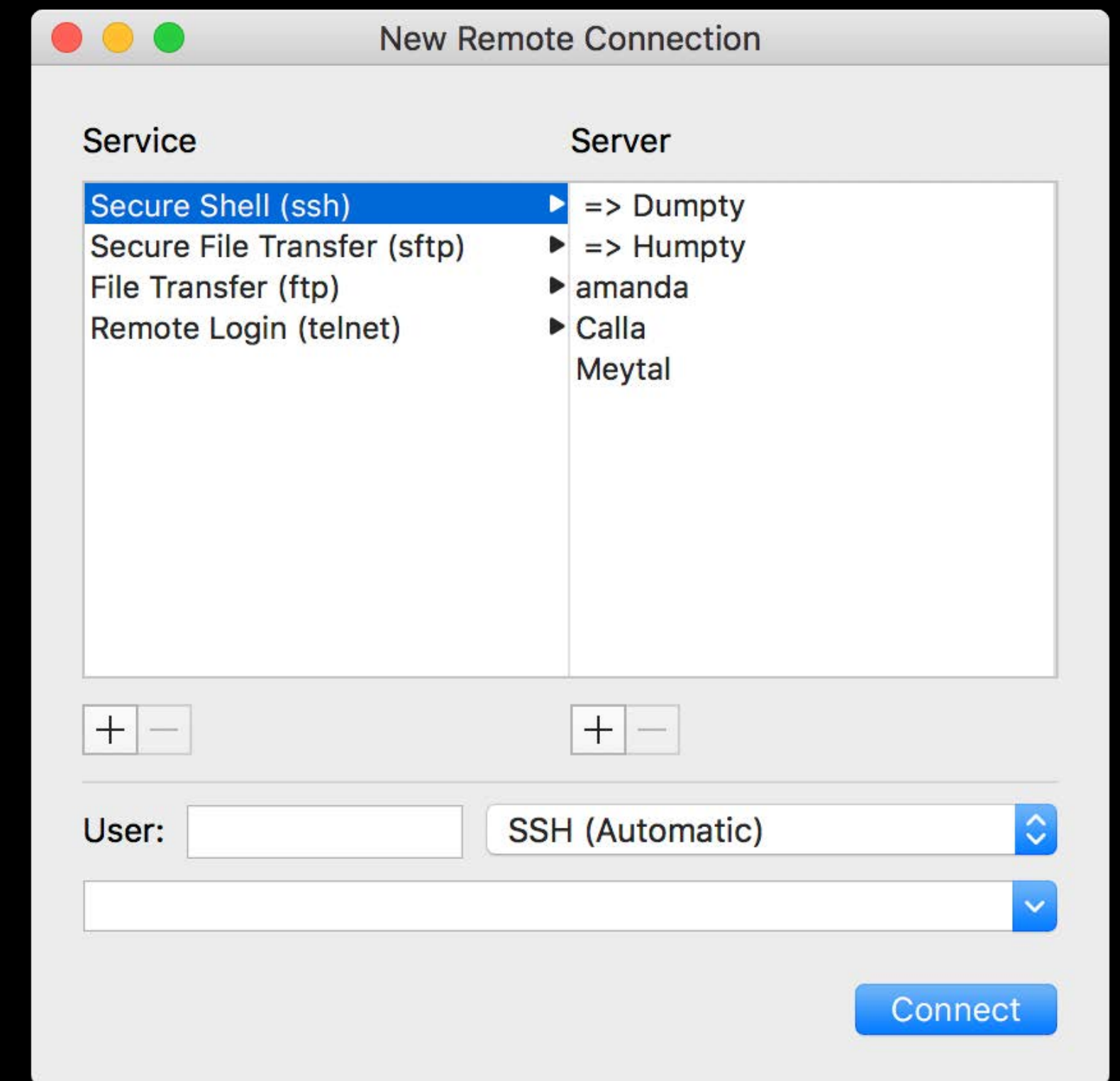
# Terminal: New Remote Connection

Size and shape of UI

Vertical space versus horizontal space

Interactive division

NSBrowser



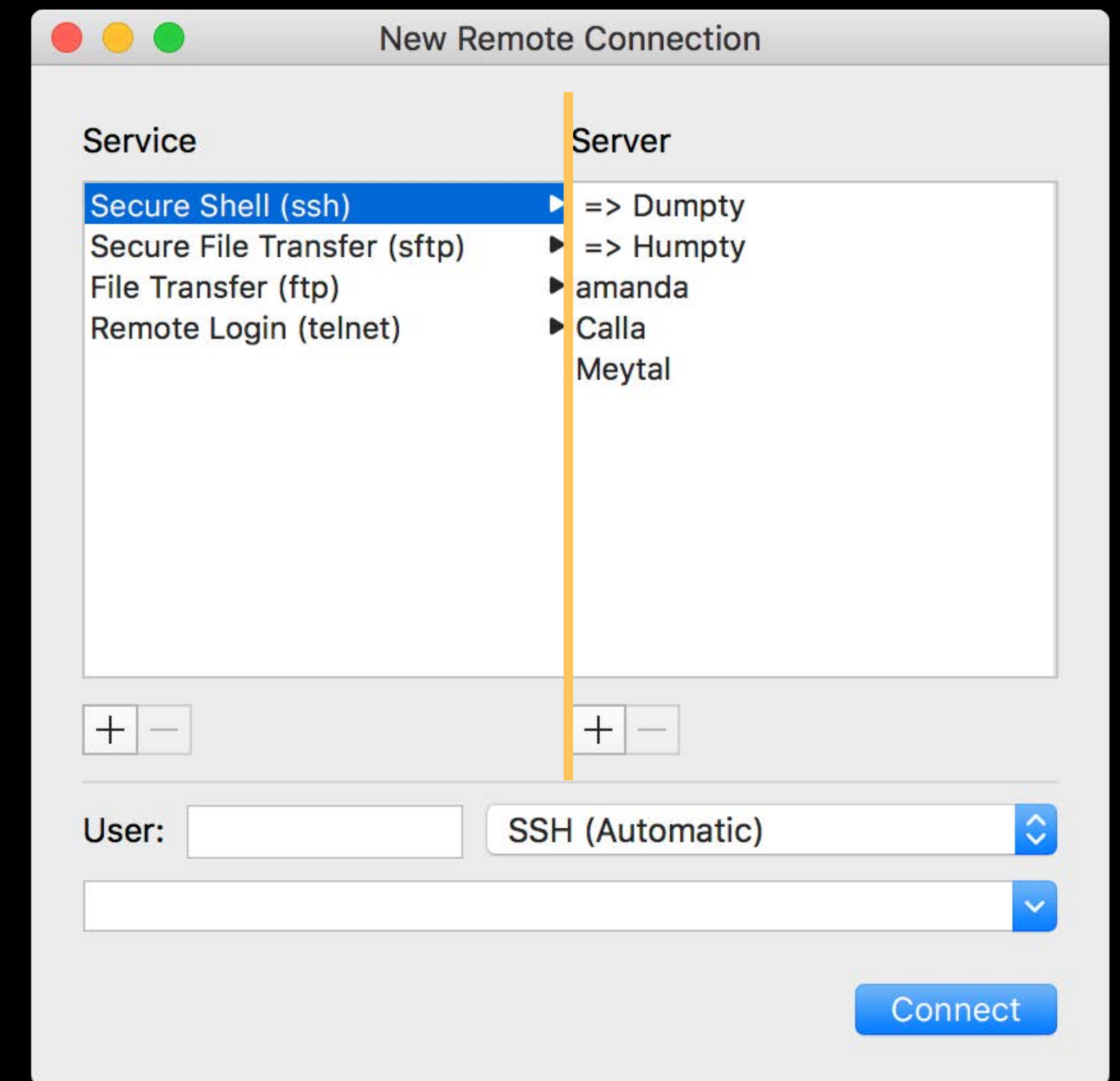
# Terminal: New Remote Connection

Size and shape of UI

Vertical space versus horizontal space

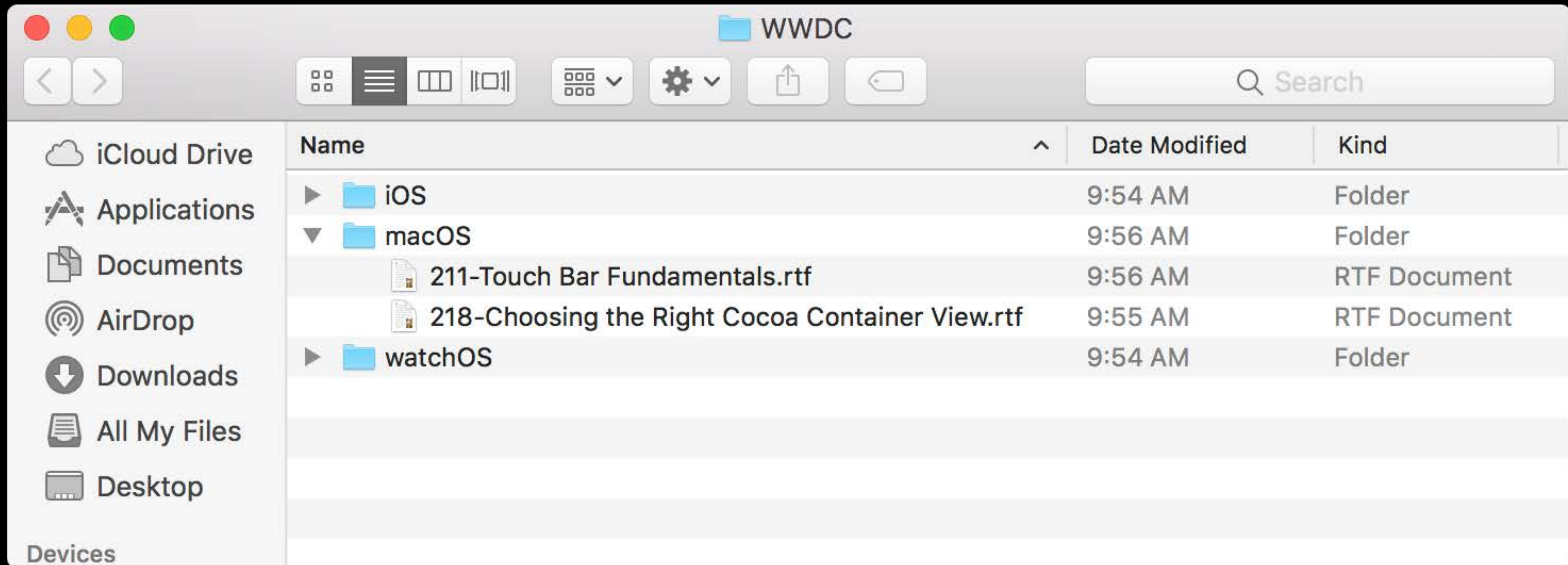
Interactive division

NSBrowser



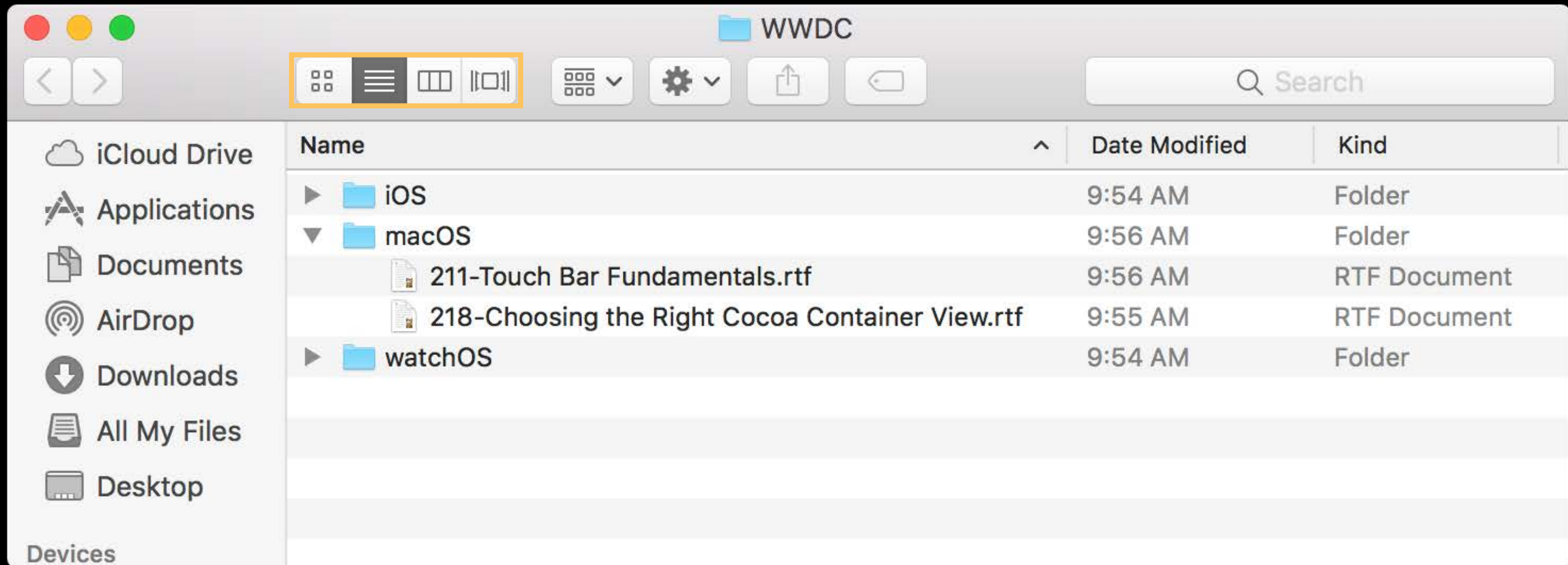
# User Preferences

## Finder



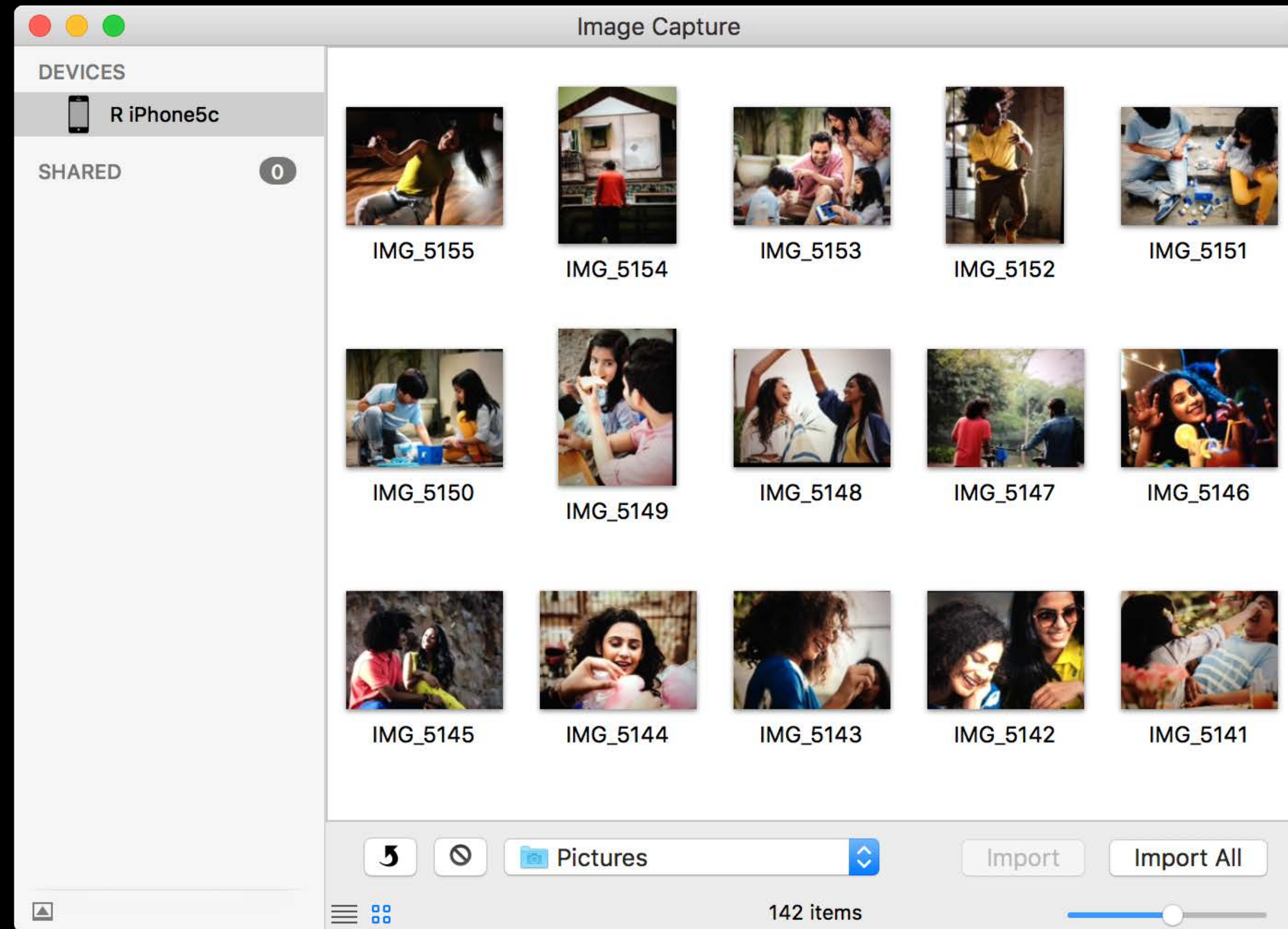
# User Preferences

## Finder



# Users preferences

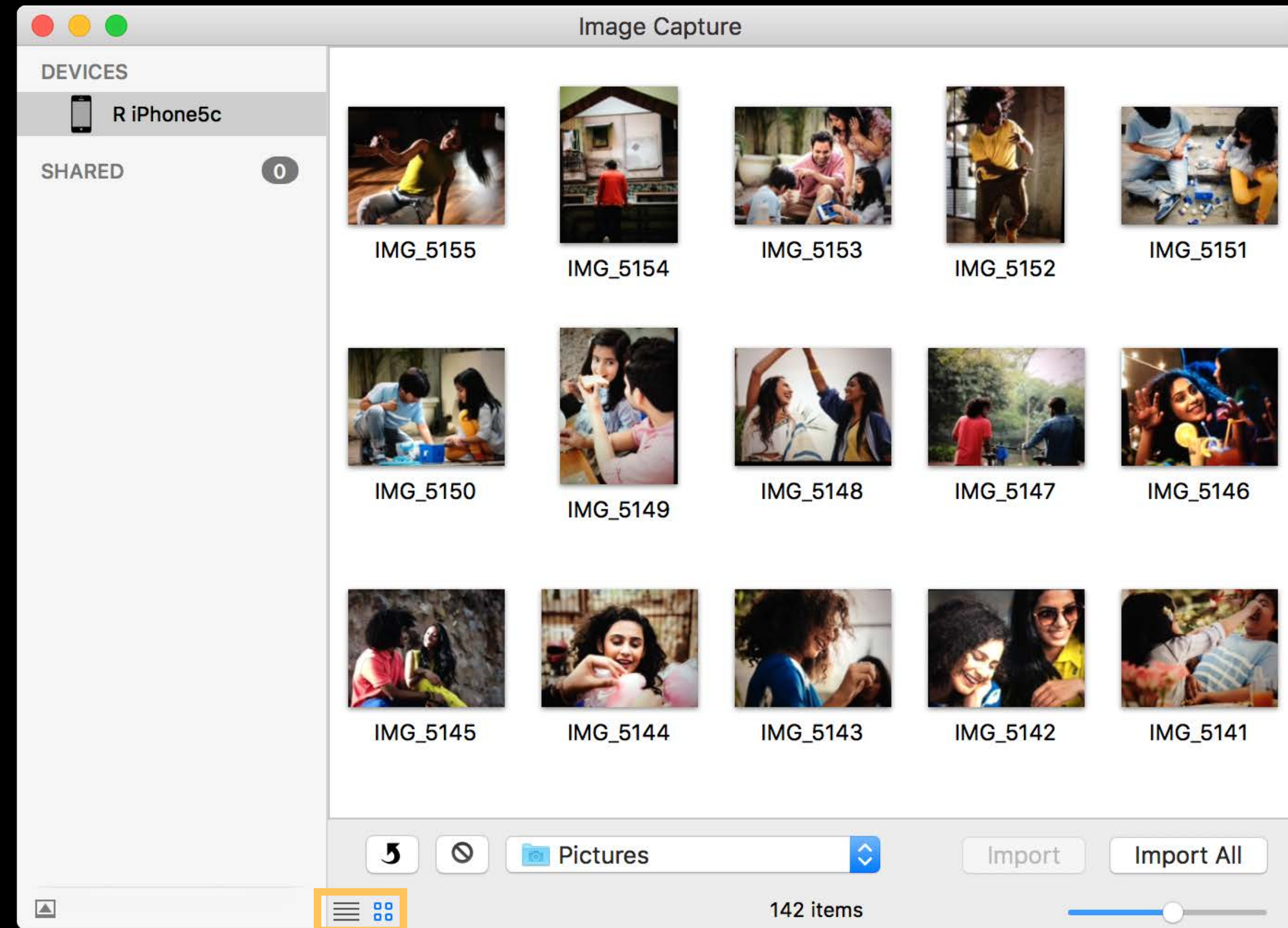
## Image capture





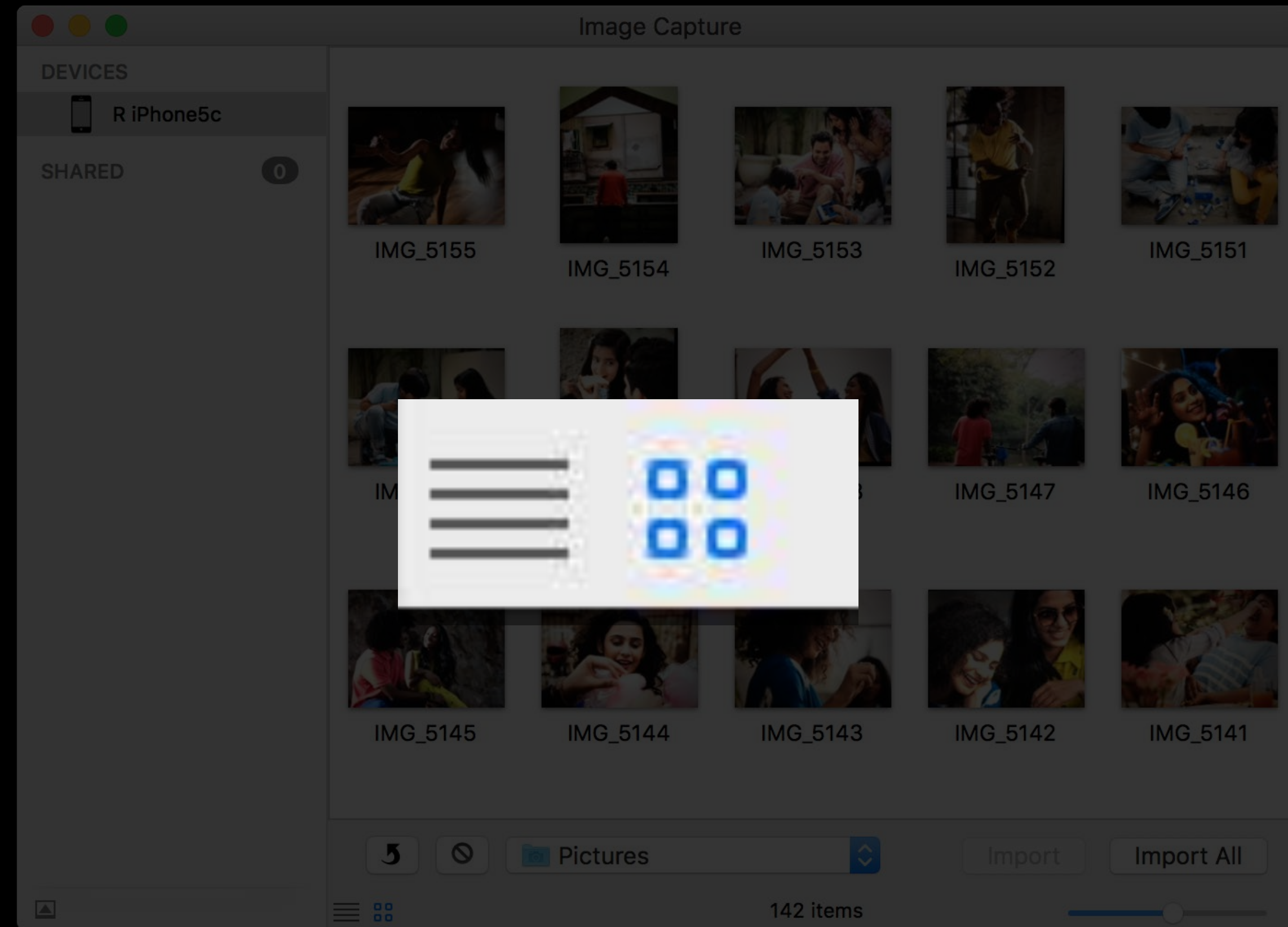
# Users preferences

## Image capture



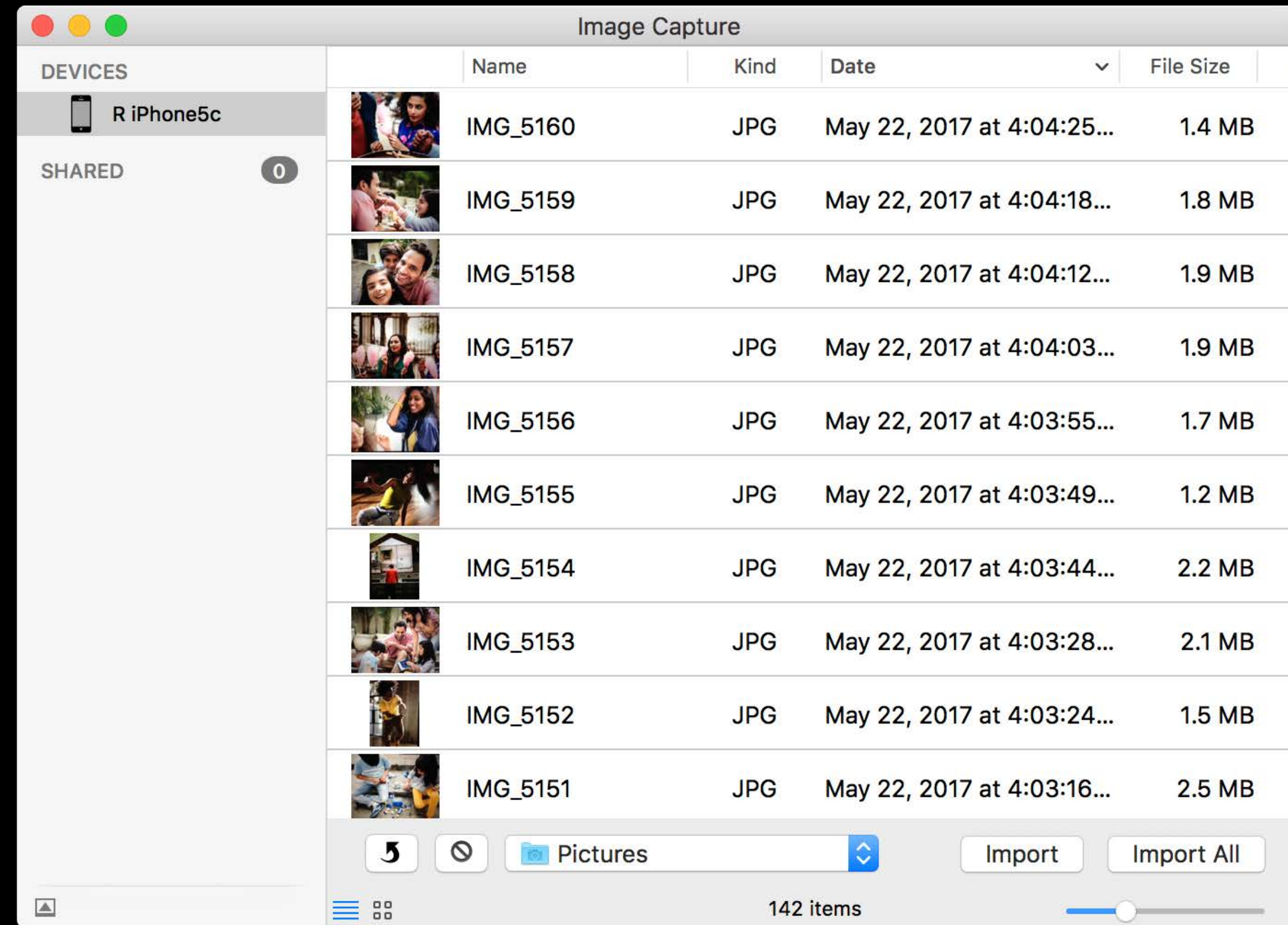
# Users preferences

## Image capture

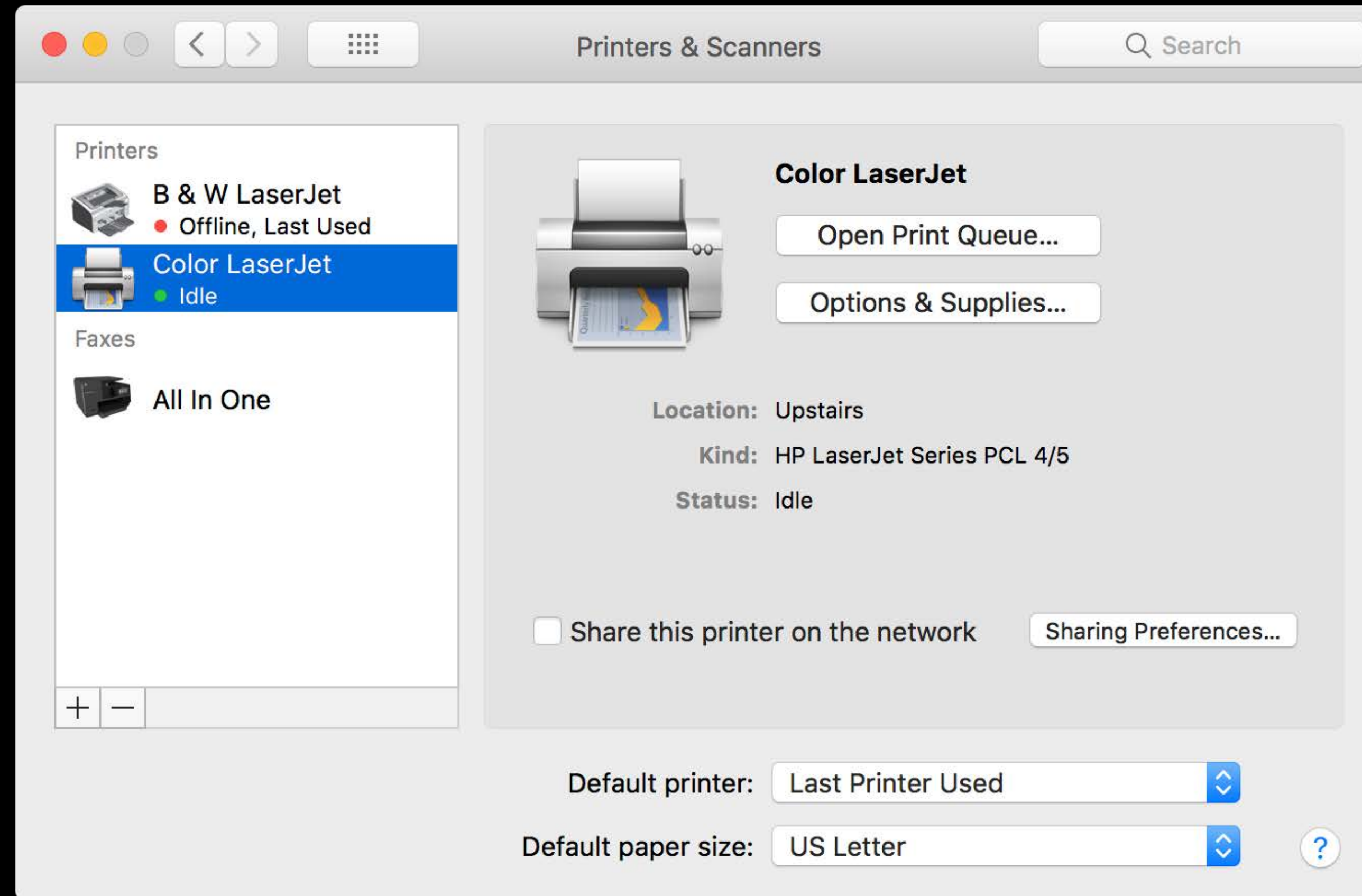


# Users preferences

## Image capture

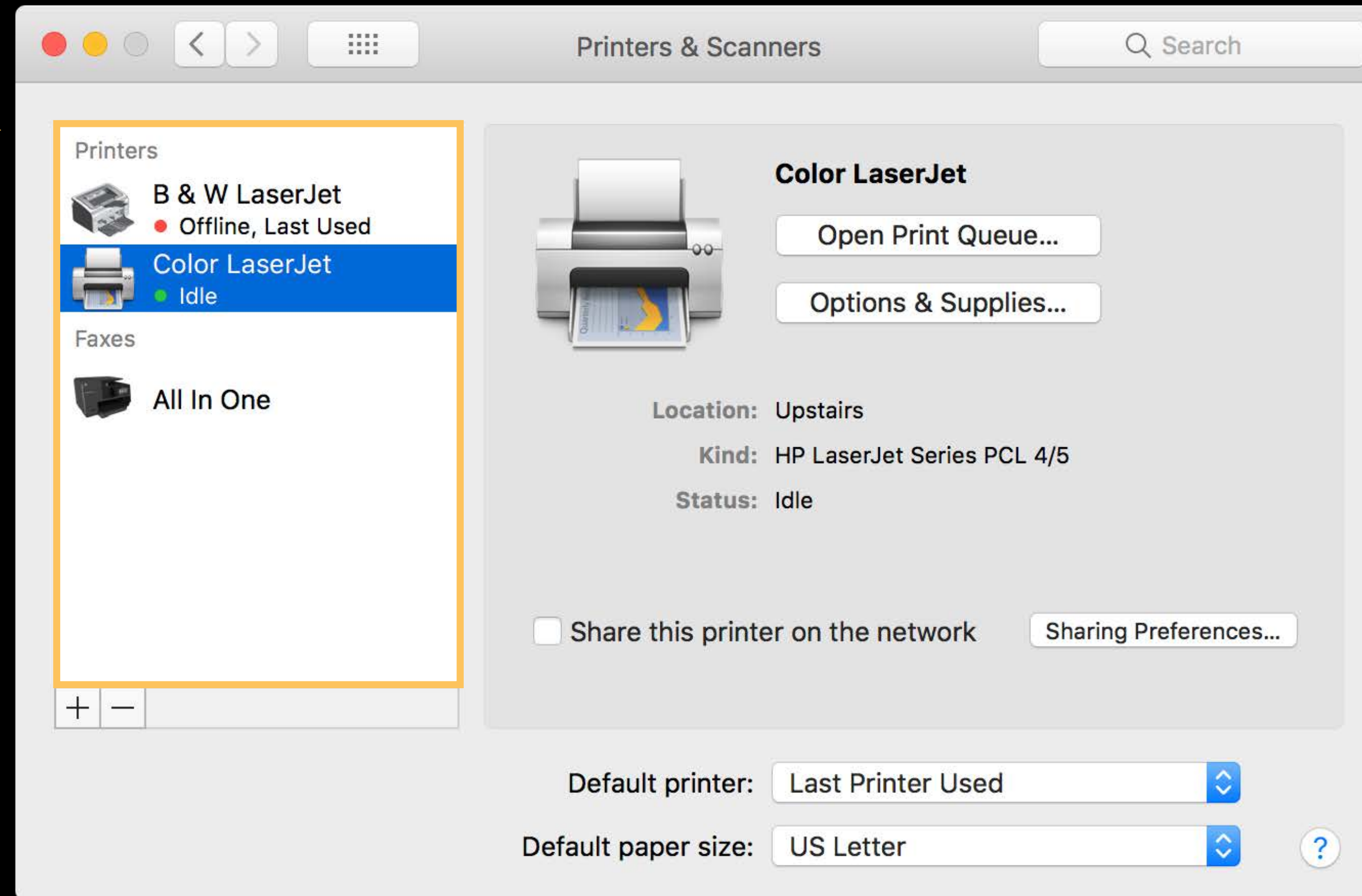


# Printers



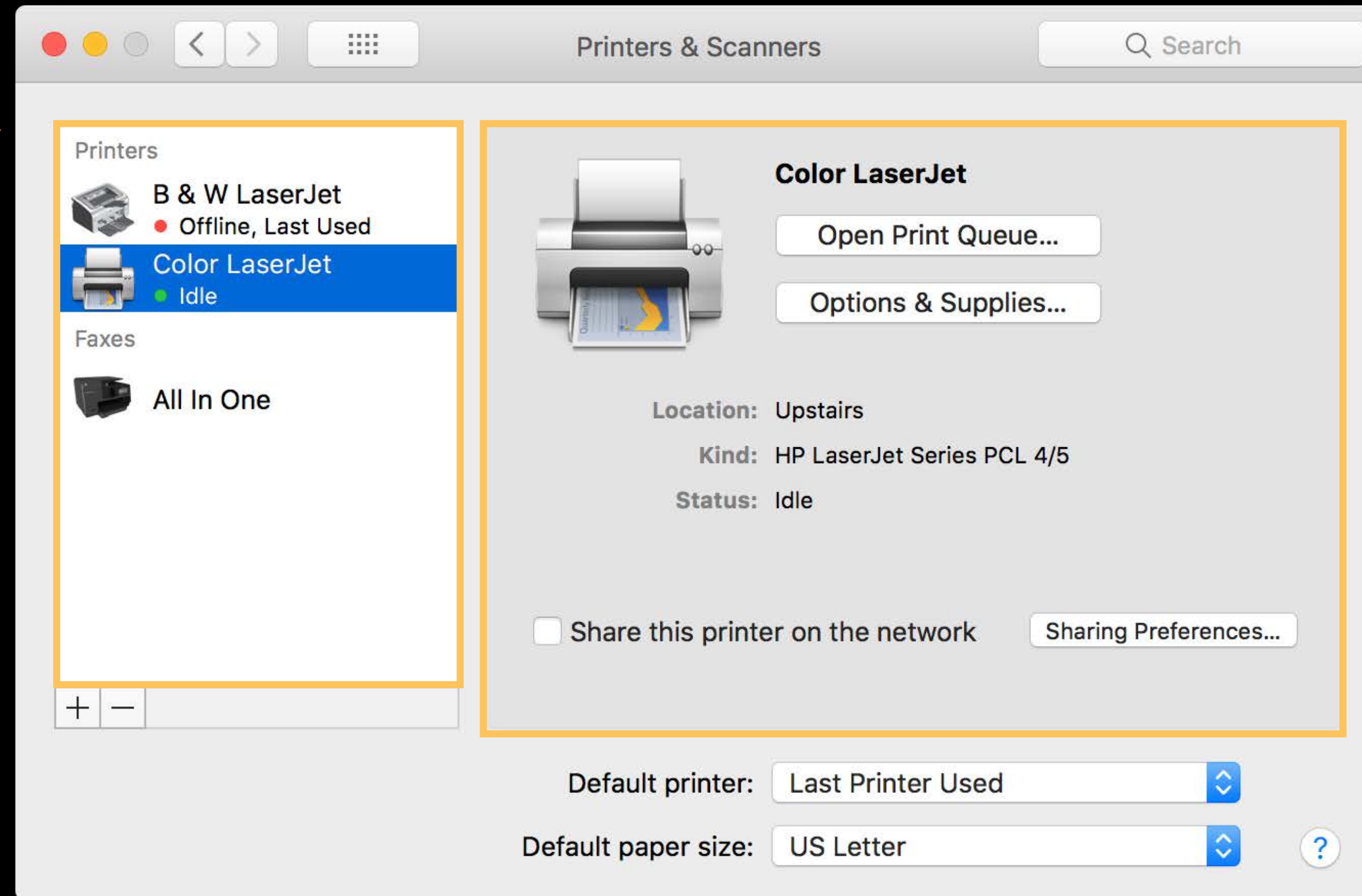
# Printers

NSTableView →



# Printers

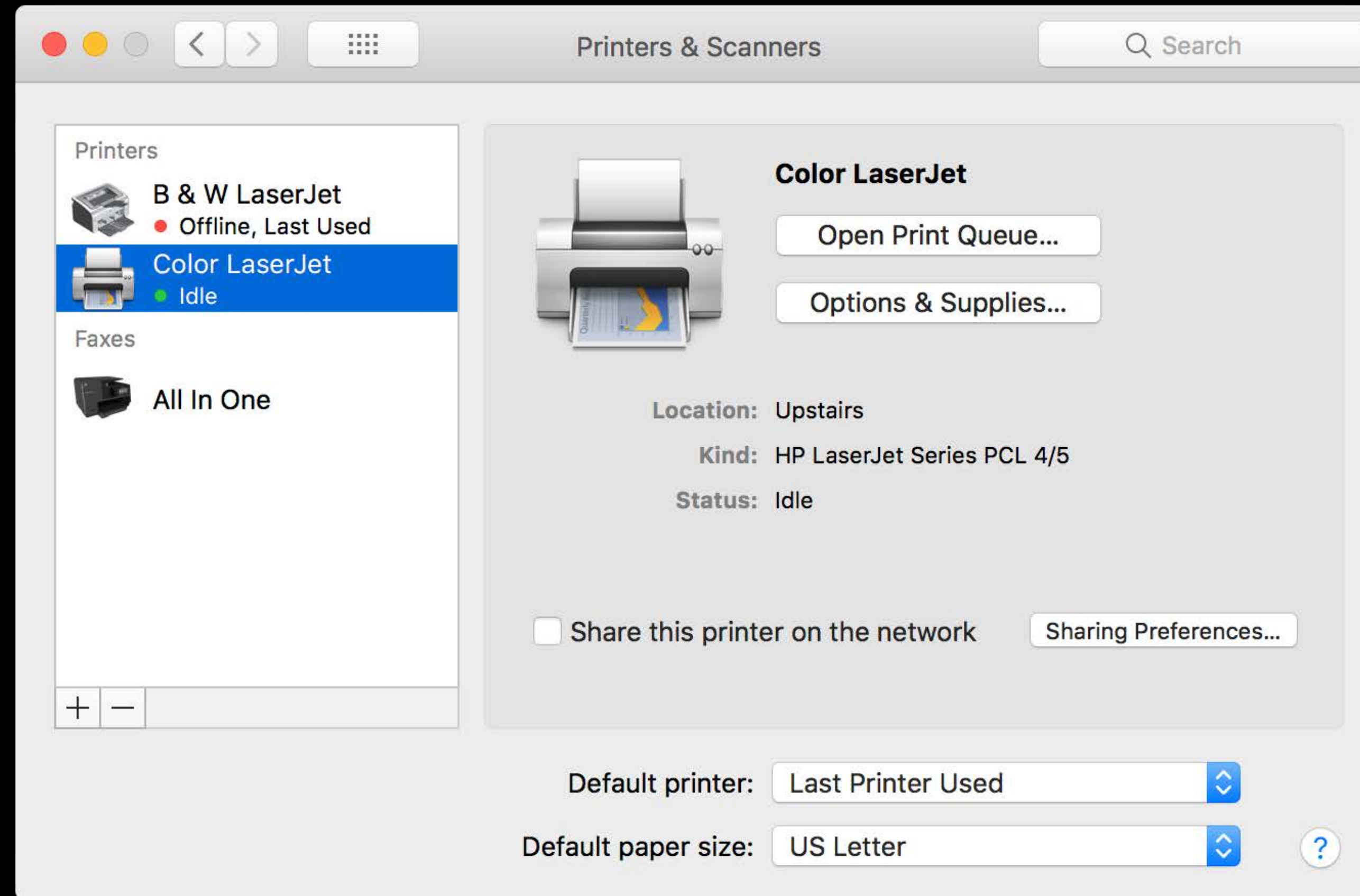
NSTableView



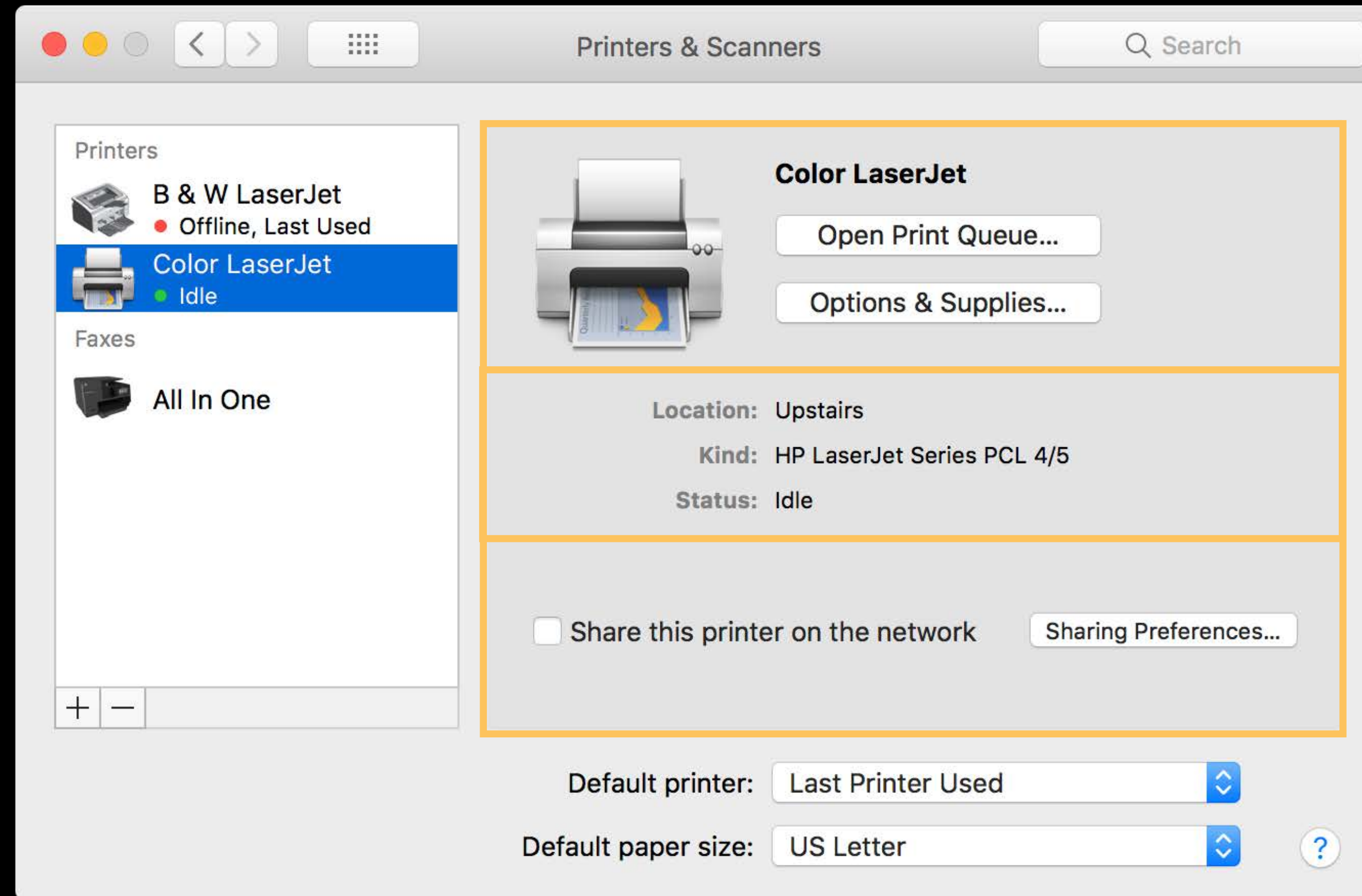
NSTabView



# Printers



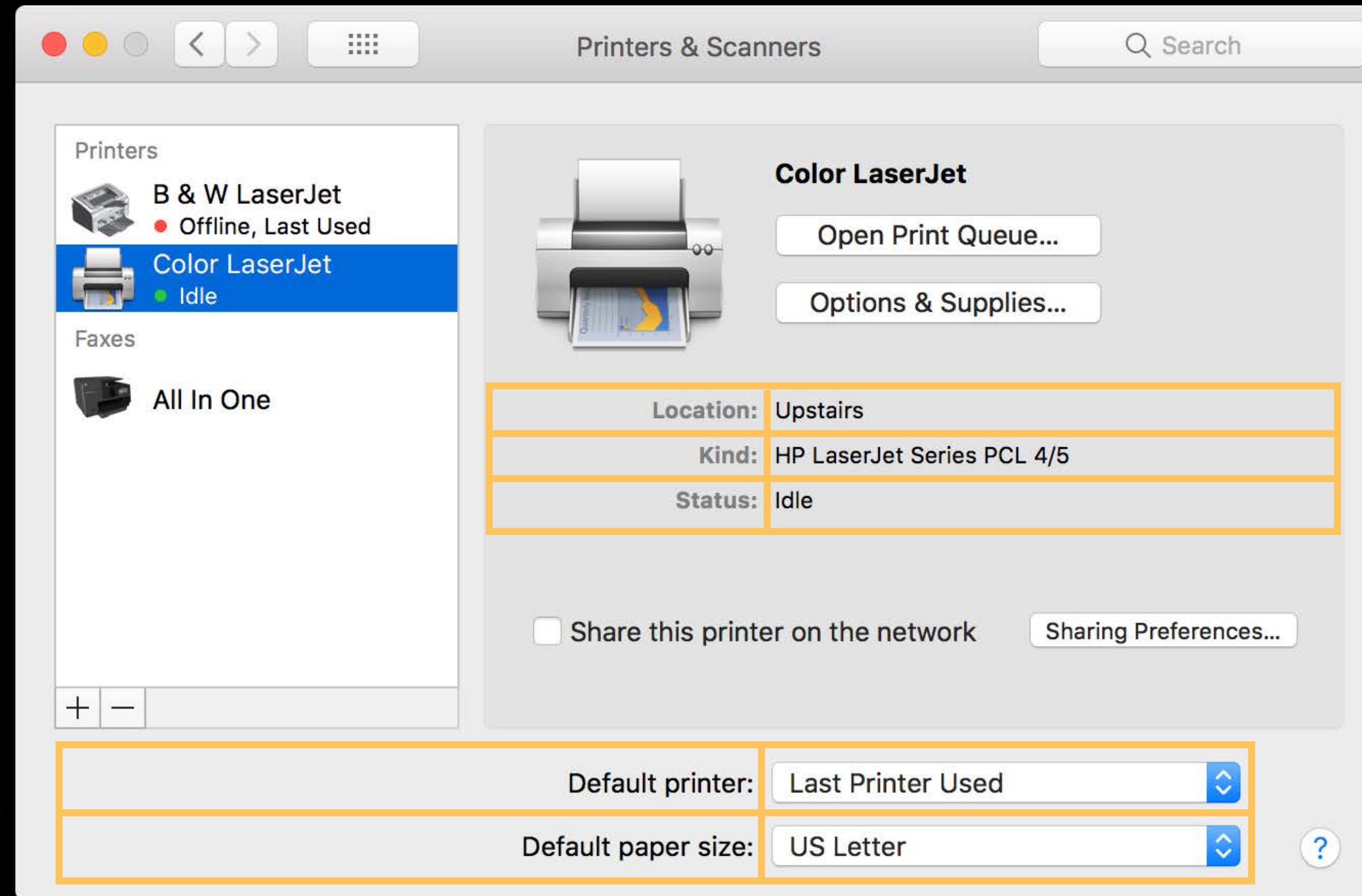
# Printers



NSStackView



# Printers



NSGridView →

← NSGridView

# Printers


الطابعات والمساحات الضوئية

بحث

**Color LaserJet**

فتح قائمة انتظار الطباعة...

الخيارات والموارد...





الموقع:	Upstairs
النوع:	HP LaserJet Series PCL 4/5
الحالة:	خامل

تفضيلات المشاركة...


مشاركة هذه الطابعة على الشبكة

الطابعات

B & W LaserJet   
غير متصلة, آخر استخدام

**Color LaserJet**   
خامل

فاكسات

All In One 

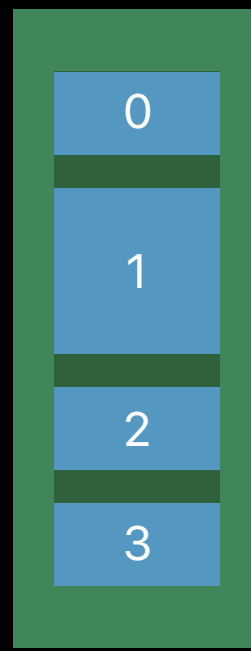
الطابعة الافتراضية: آخر طابعة تم استخدامها

حجم الورق الافتراضي: US Letter

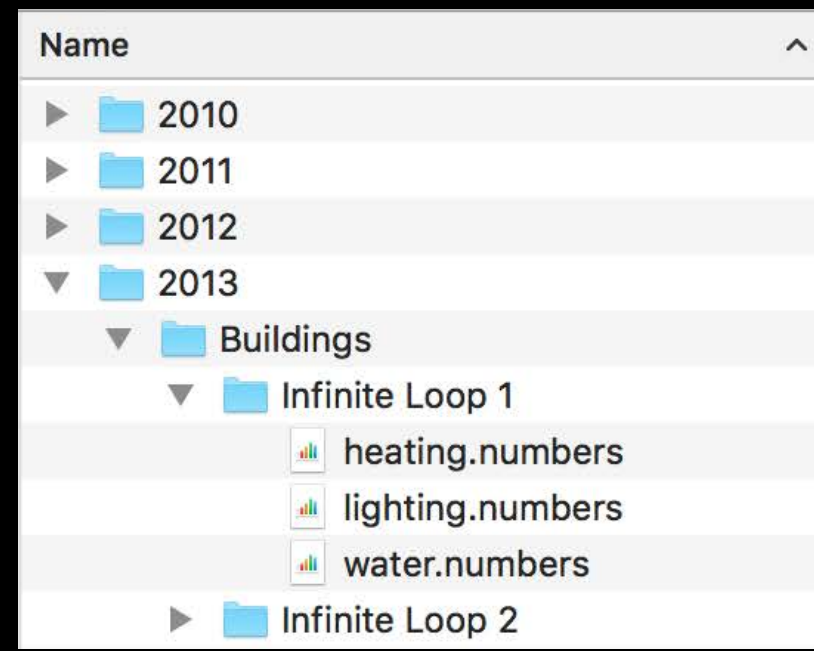
**Review**

# Ready-Made Views for Many Uses

# Ready-Made Views for Many Uses



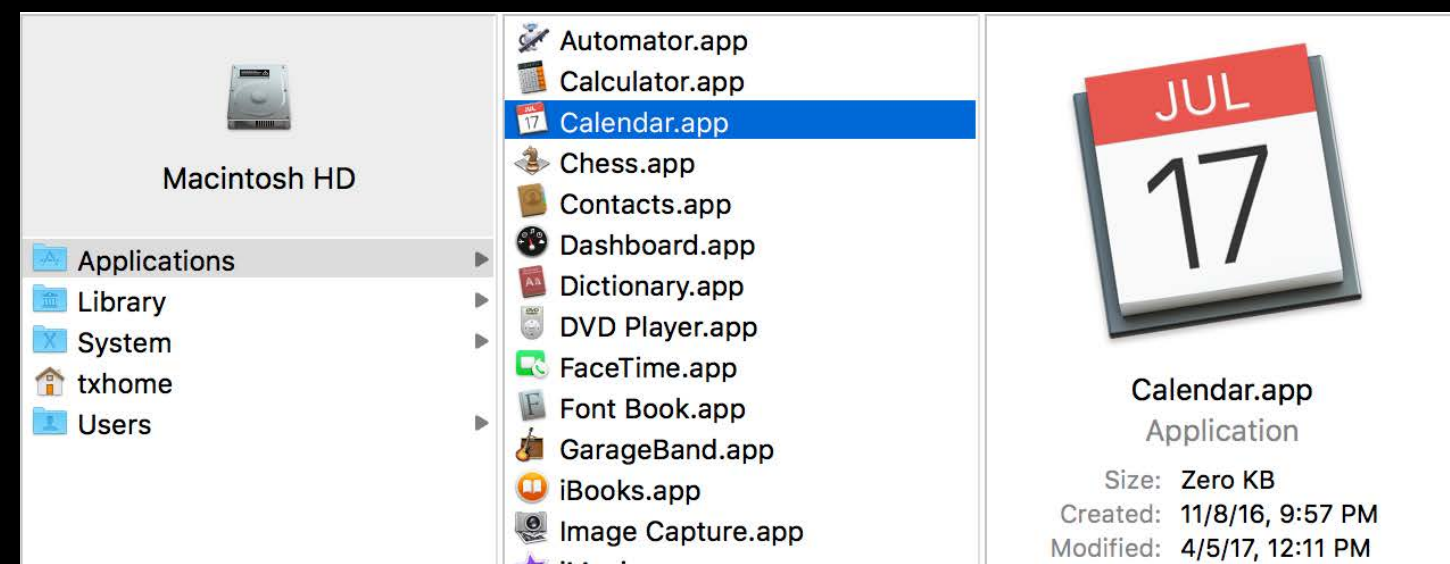
NSStackView



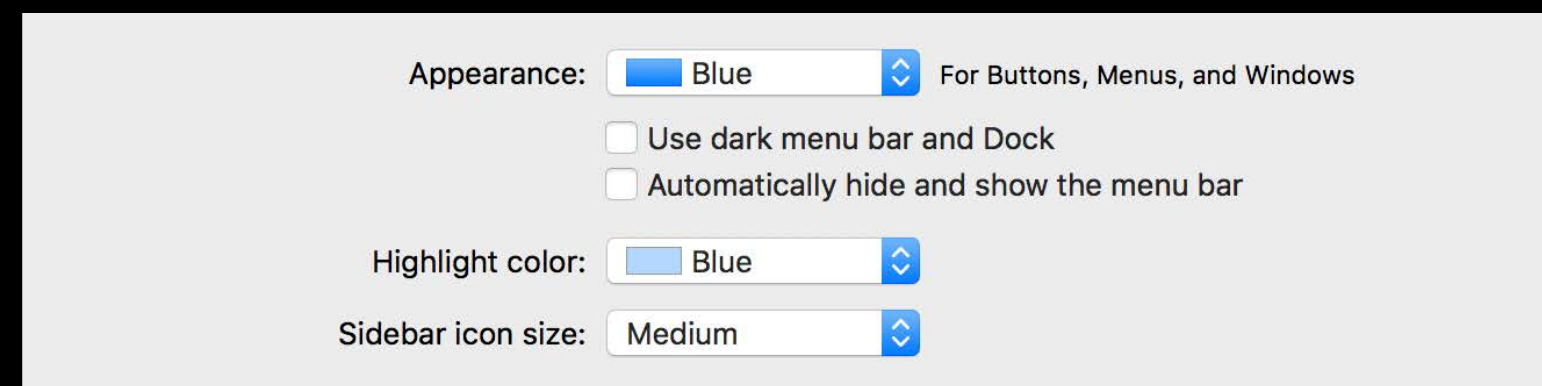
NSOutlineView

Process Name	% CPU	CPU Time	Threads	Idle Wake Ups	PID	User
Activity Monitor	1.4	22.82	7	1	921	appleseed
SystemUIServer	0.1	2.24	5	1	397	appleseed
Keynote	0.0	1:44.21	7	1	630	appleseed
SafariCloudHistoryPushAgent	0.0	1.16	4	1	543	appleseed
Mail	0.0	1:42.54	10	0	878	appleseed
nsurlstoraged	0.0	3.19	5	0	426	appleseed
Safari Networking	0.0	57.01	8	0	499	appleseed
Dock	0.0	3.37	3	0	392	appleseed
Finder	0.0	3.06	6	0	398	appleseed
useractivityd	0.0	0.54	3	0	449	appleseed
accountsd	0.0	3.16	5	0	395	appleseed
cfprefsd	0.0	1.79	3	0	369	appleseed
com.apple.appkit.xpc.openA...	0.0	2.26	4	1	634	appleseed
com.apple.preference.energy...	0.0	0.58	5	0	855	appleseed
sharingd	0.0	1.56	3	0	451	appleseed
cloudd	0.0	8.46	6	0	448	appleseed
Safari	0.0	2:36.79	9	1	386	appleseed
Safari Database Storage	0.0	0.23	4	0	655	appleseed
Mail Web Content	0.0	0.40	7	1	885	appleseed
LaterAgent	0.0	0.32	4	0	549	appleseed
com.apple.dock.extra	0.0	0.50	4	1	452	appleseed
com.apple.preference.displa...	0.0	0.24	4	0	857	appleseed
AppleConnectAgent	0.0	1.08	6	0	457	appleseed

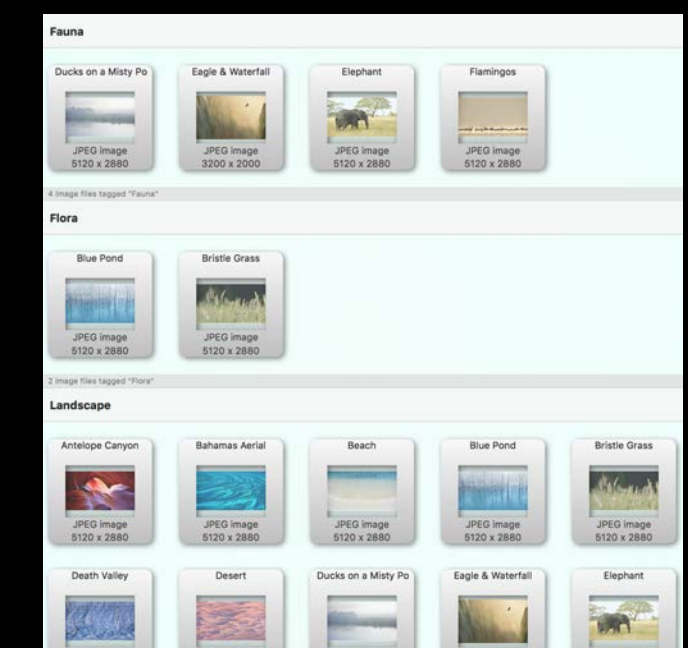
NSTableView



NSBrowser



NSGridView



NSCollectionView

# Learn More

## NSStackView

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Mysteries of Auto Layout, Part 1

WWDC15

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- [Guides: Auto Layout Cookbook](#)
- [Sample Code: InfoBarStackView, Exhibition](#)

## NSGridView

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What's New in Auto Layout

WWDC16

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# Learn More

## NSTableView and NSOutlineView

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Crafting Modern Cocoa Apps

WWDC16

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- Guides: [Table View Programming Guide for Mac](#), [Outline View Programming Topics](#), [Table View Programming Guide](#)
- Sample Code: [TableViewPlayground](#)

## NSBrowser

- Guides: [Browser Programming Topics](#)
- Sample Code: [SimpleCocoaBrowser](#), [ComplexBrowser](#)

# Learn More

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What's New in UICollectionView

WWDC15

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## UICollectionView

- Sample Code: CocoaSlideCollection
- Reference: UICollectionView, UICollectionViewLayout, and friends



# More Information

<https://developer.apple.com/wwdc17/218>

# Related Sessions

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[Advanced Touch Bar](#)

Grand Ballroom A

Wednesday 5:10PM

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[Cocoa Development Tips](#)

Grand Ballroom B

Friday 9:00AM

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# Labs

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Cocoa Touch Bar Lab

Technology Lab C

Thu 9:00AM-11:00AM

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Cocoa Lab

Technology Lab B

Fri 1:50PM-3:20PM

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