

The background of the image is a collage of various items: a magnifying glass with an Apple logo on its handle, a green pen holder with several pens, a globe, and some papers. The text is overlaid on this background.

Worldwide

Developers

Conference



Rhapsody Text System and Localization

Ali Ozer

Andy Daniels



Rhapsody Text System

Ali Ozer

**Yellow Box
Application Frameworks**

Text AND Localization?

Really, internationalization

- **Users want to be able to:**
 - Create and exchange multilingual documents
 - Use any application in any language on any system
- **Developers need to be able to:**
 - Write applications that automatically work in any language
 - Localize applications easily and incrementally



Internationalization

One personal reason why...

Ali Ozer



Internationalization

One personal reason why...

Ali Ozer

Ali Özer



Internationalization

One personal reason why...

Ali Ozer

Ali Özer

ALİ ÖZER



Text System

Features

- **International**
- **Powerful**
- **Flexible**



Text System

International built-in

- **Unicode characters in the backing store**
- **Character to glyph conversion for display**
- **Glyph reordering, required for displaying Indic scripts**
- **Inline input methods, for Asian language input**



Text System

Flexible, for a wide range of uses

- **Multiple replaceable classes with public APIs**
- **Uses of the system**
 - Basic string drawing
 - User interface widgets
 - Simple word processing
 - Specialized text editing
 - High-end publishing



Text System

Powerful, with many out-of-the-box features

- Multiple fonts, graphics, paragraph styles with ruler support
- Ligatures, kerning, diacritical marks, baseline adjustment
- Spelling checker, text services
- Background layout
- Copy/paste, read/write rich text



Text System

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- **Multiple fonts, graphics, paragraph styles with ruler support**
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- **Background layout**
- **Copy/paste, read/write rich text**

and...



Text System

No 32K limit!





Demo

NSString

- Stores an array of Unicode characters
- Provides rich functionality
- Allows conversion to and from other encodings
 - Uses “default system encoding” to deal with untagged characters



NSAttributedString

- Stores an NSString and arbitrary attributes on each character
- Keeps attributes in NSDictionary (key/value pairs)
- Predefined attributes include: font, color, underline, kerning...
- Implementation and API optimized for runs of same attributes



NSAttributedString

Example

HELLO WORLD



NSAttributedString

Example

HELLO *WORLD*



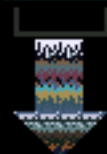
Font
Courier 72
Color
LightBlue
Underline
Solid



NSAttributedString

Example

HELLO *WORLD*



Font
Courier 72
Color
LightBlue
Underline
Solid

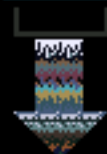
Font
Courier 60
Color
LightBlue
Underline
None



NSAttributedString

Example

HELLO **WORLD**



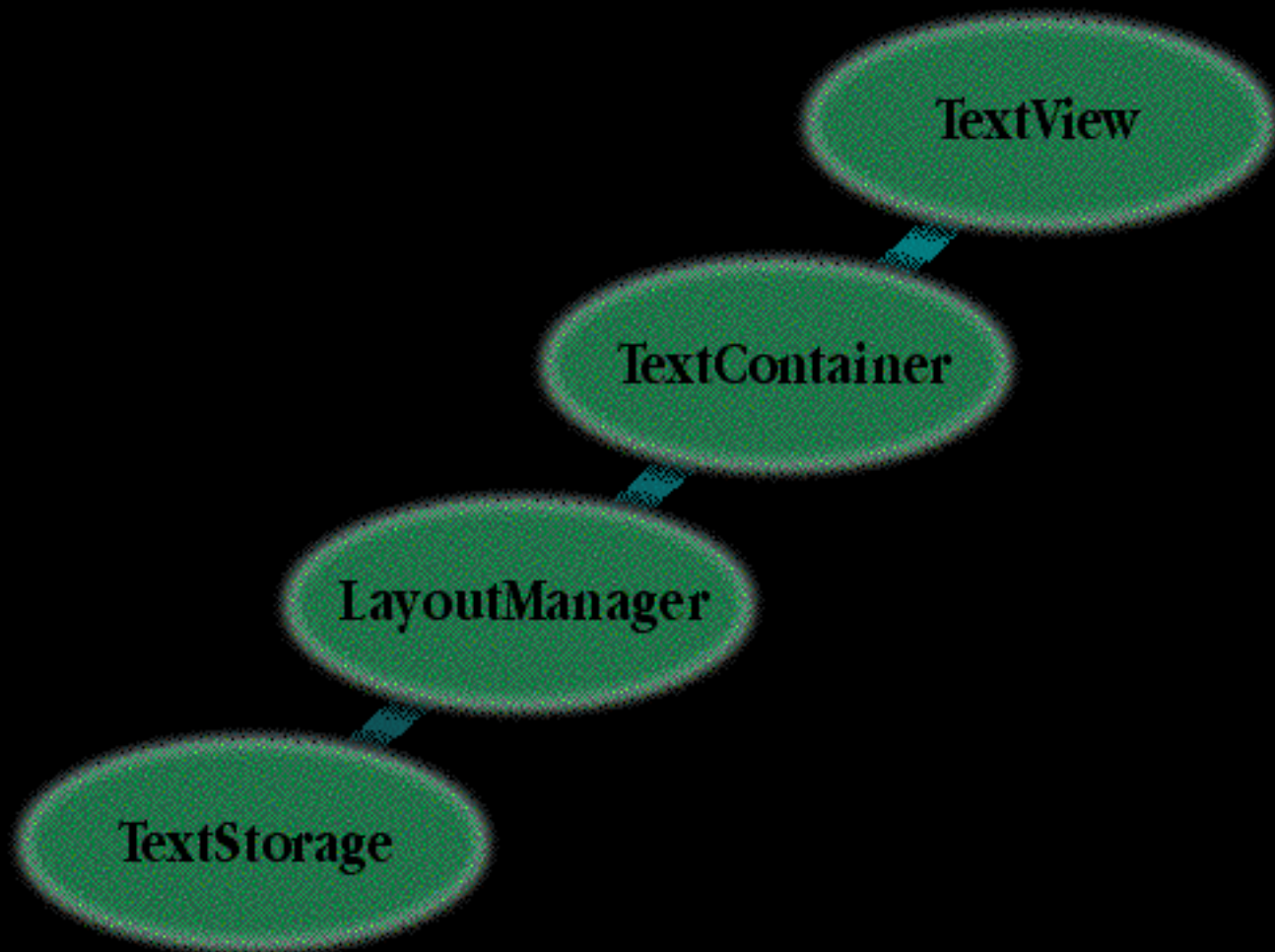
Font
Courier 72
Color
LightBlue
Underline
Solid

Font
Courier 60
Color
LightBlue
Underline
None

Font
Courier-Oblique 60
Color
White
Underline
None



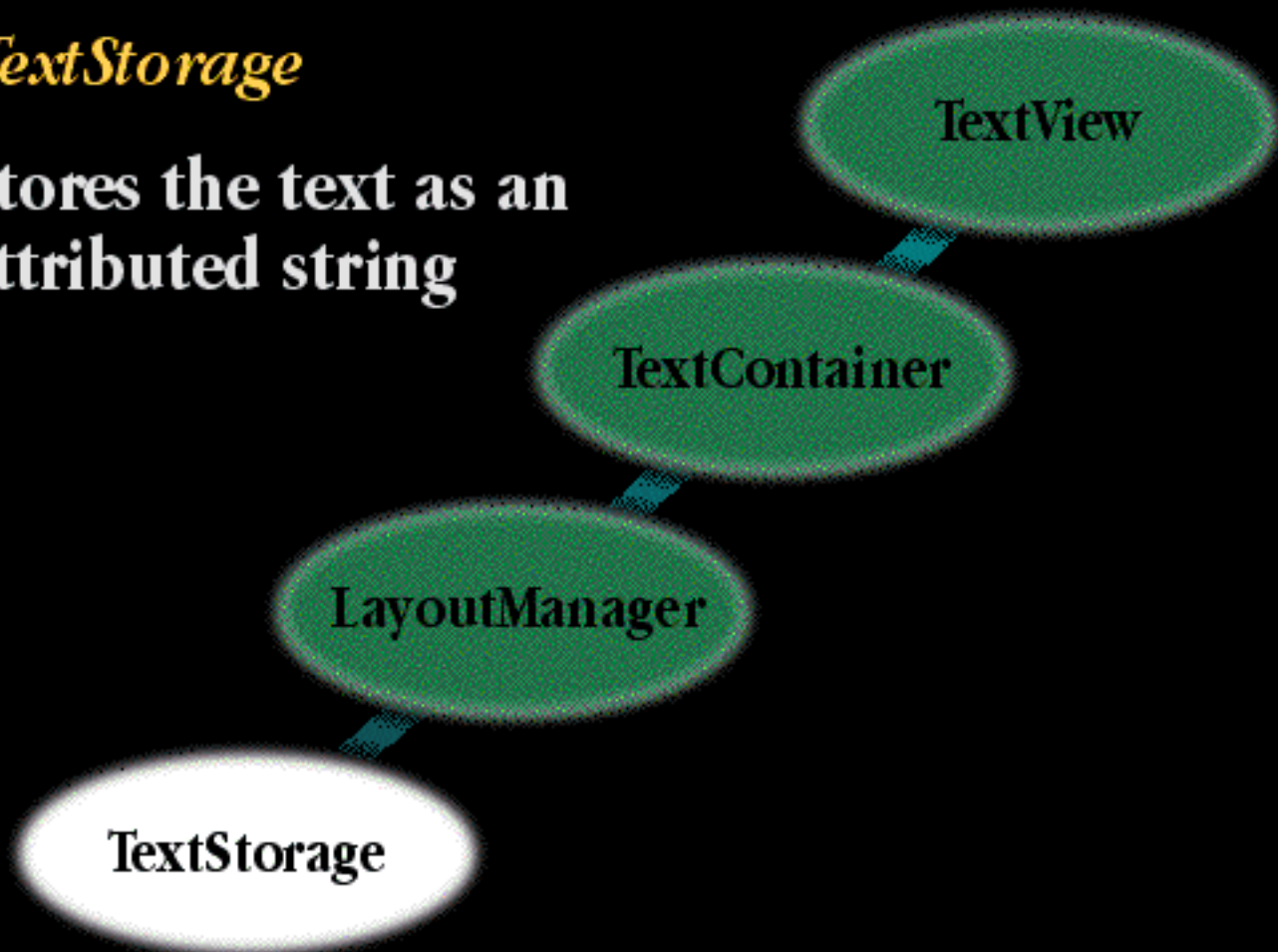
Main Text Components



Main Text Components

NSTextStorage

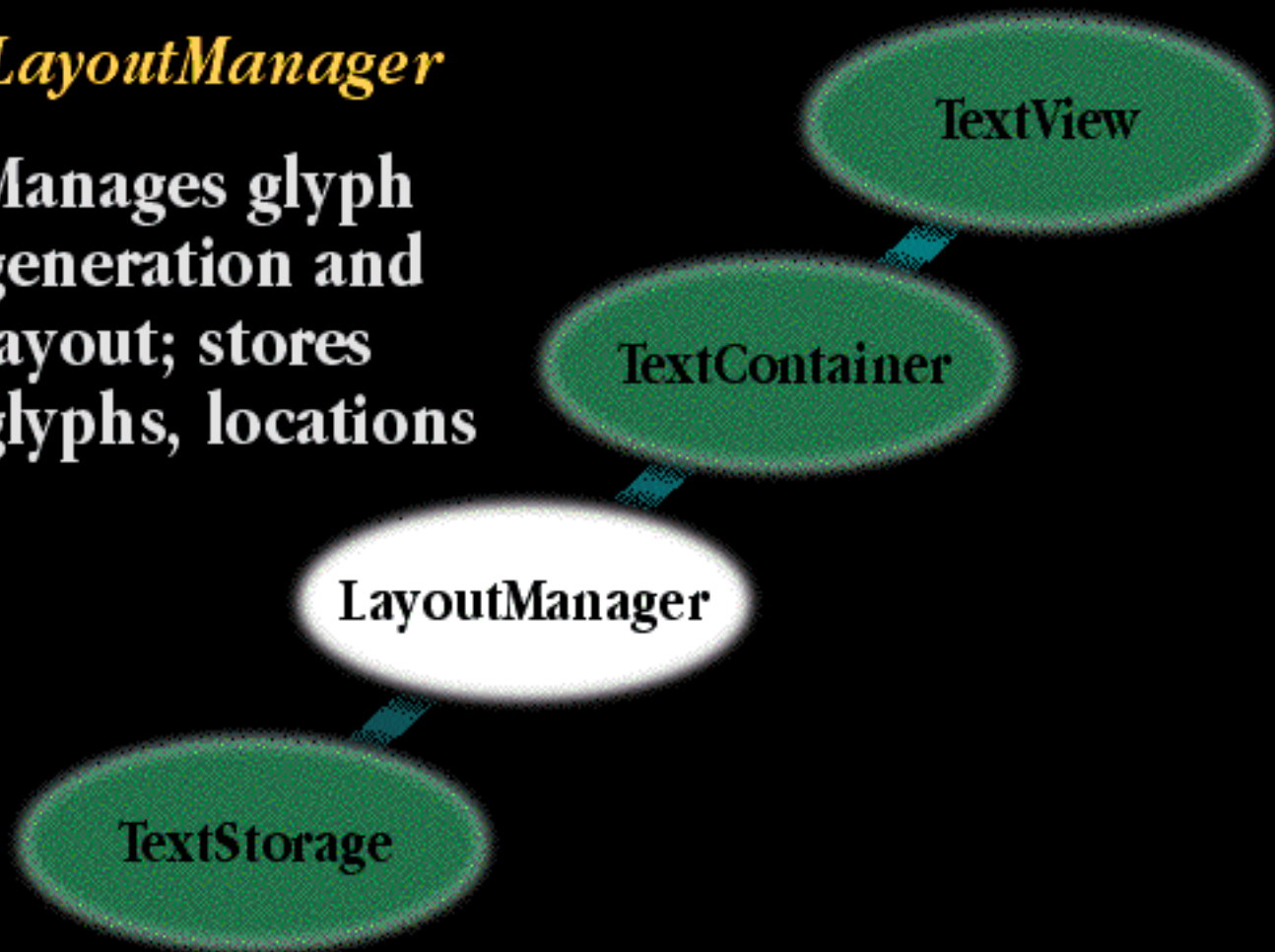
- Stores the text as an attributed string



Main Text Components

NSLayoutManager

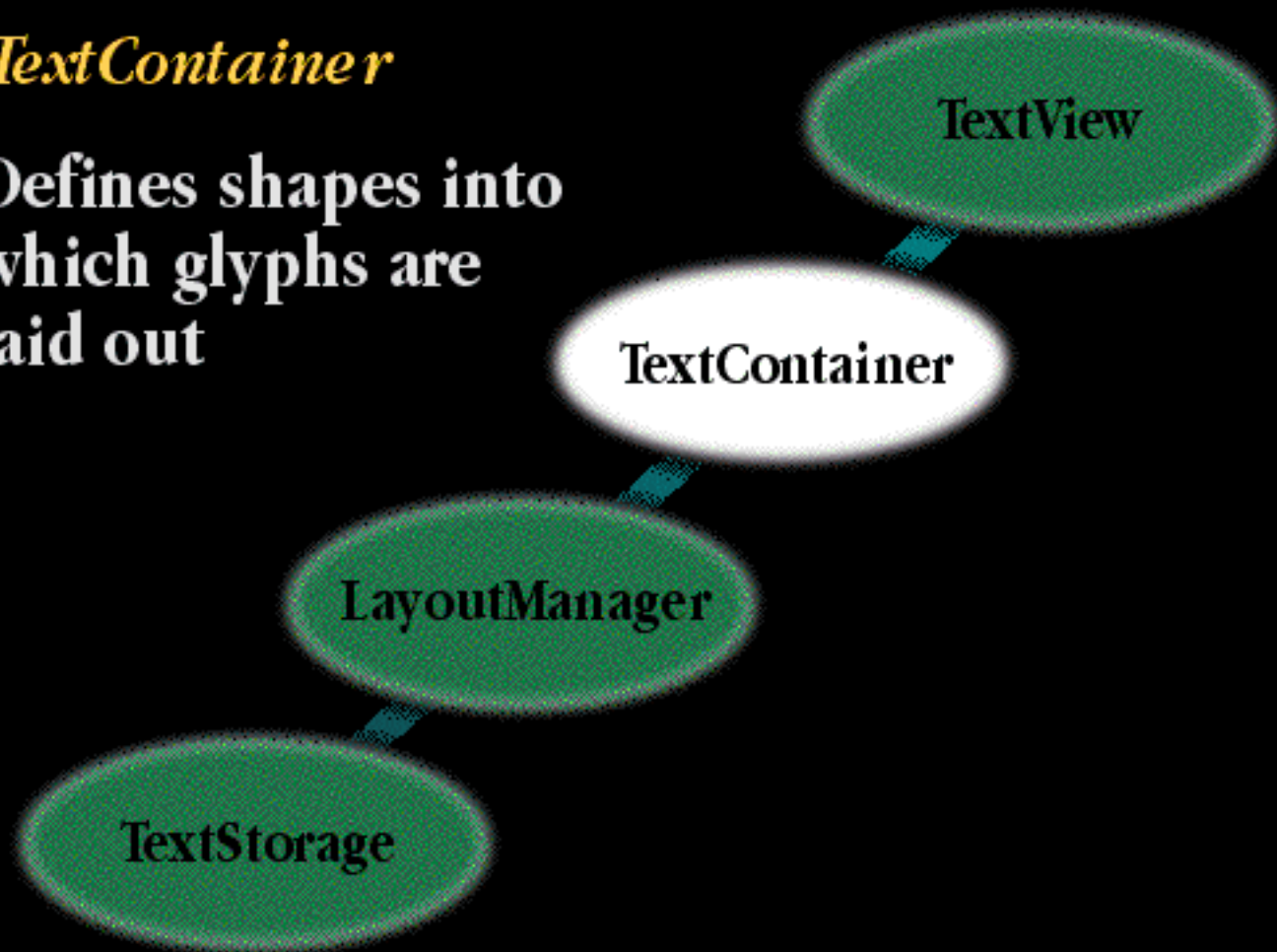
- Manages glyph generation and layout; stores glyphs, locations



Main Text Components

NSTextContainer

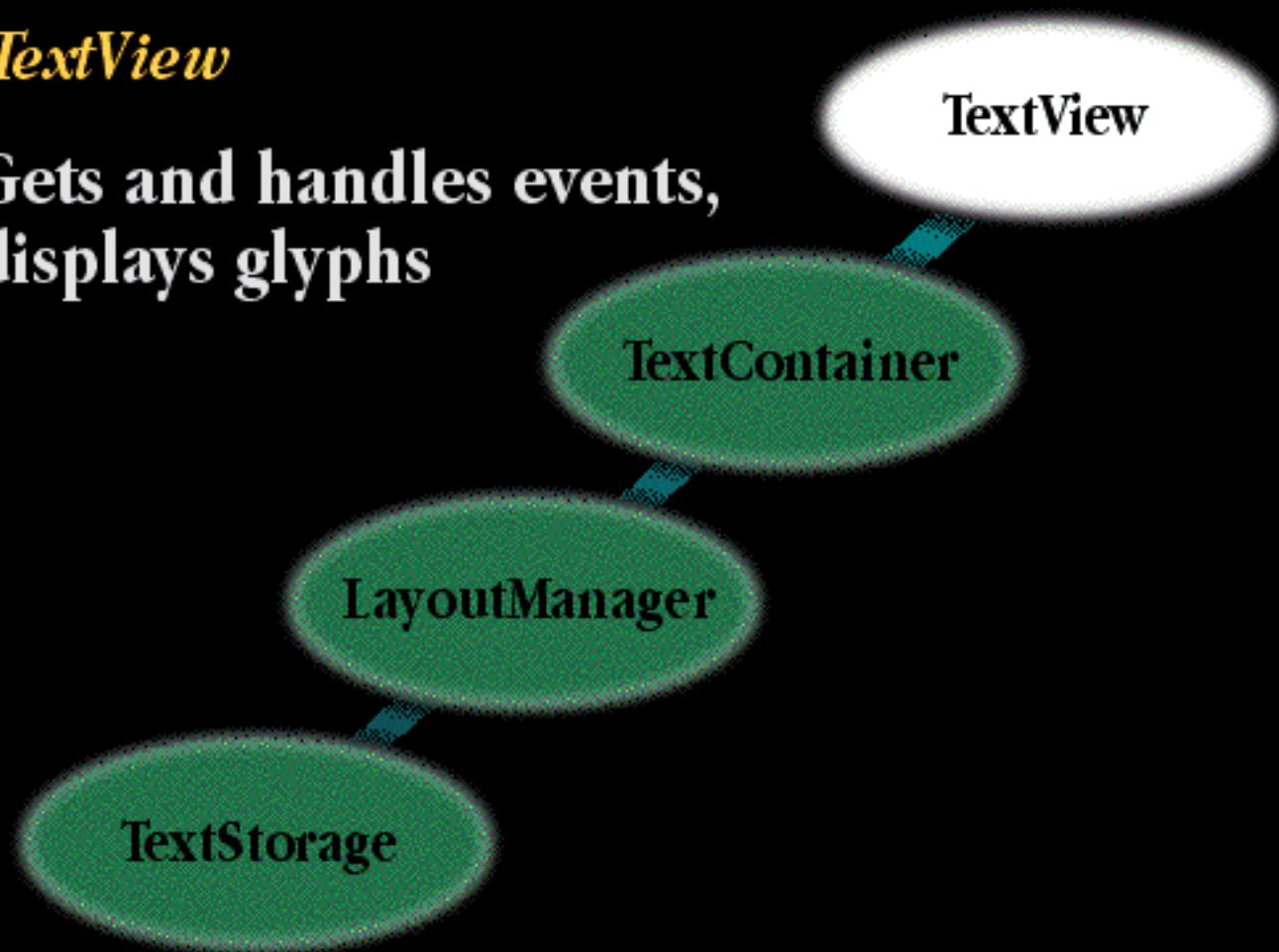
- Defines shapes into which glyphs are laid out



Main Text Components

NSTextView

- Gets and handles events, displays glyphs



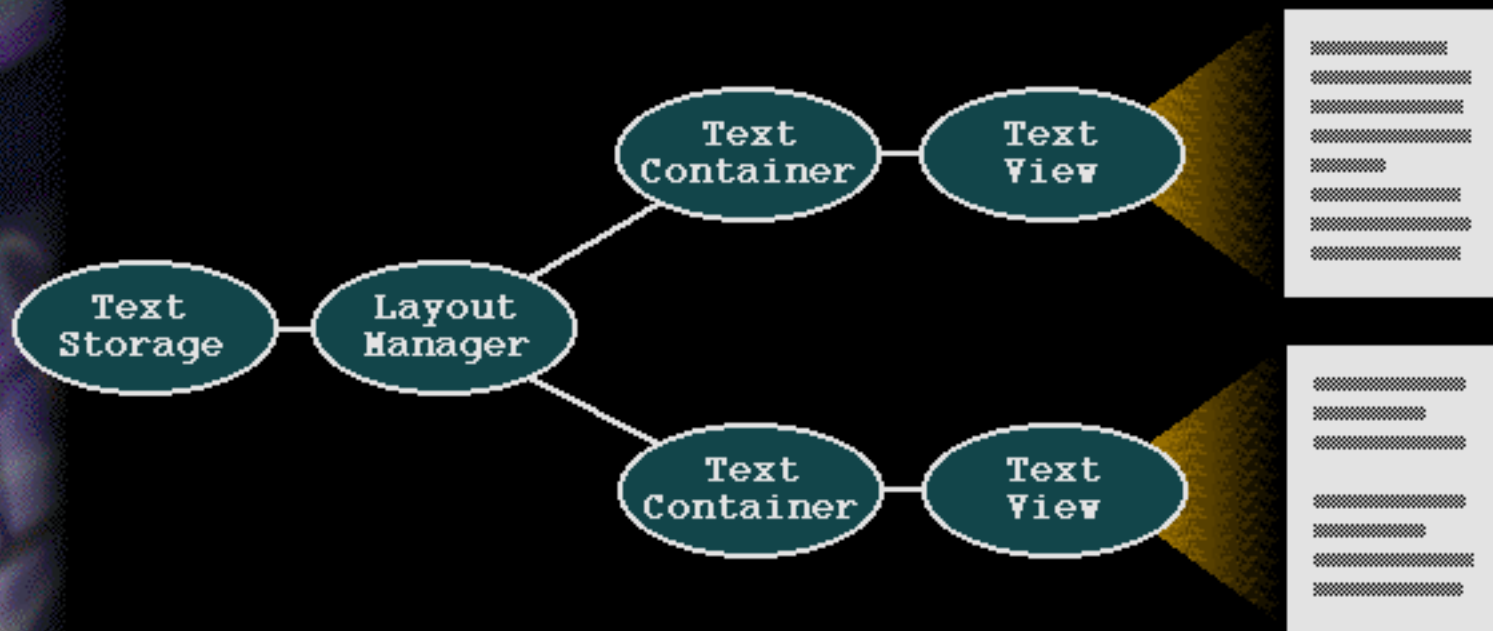
Text System Configurations

Common Configuration: Box of text



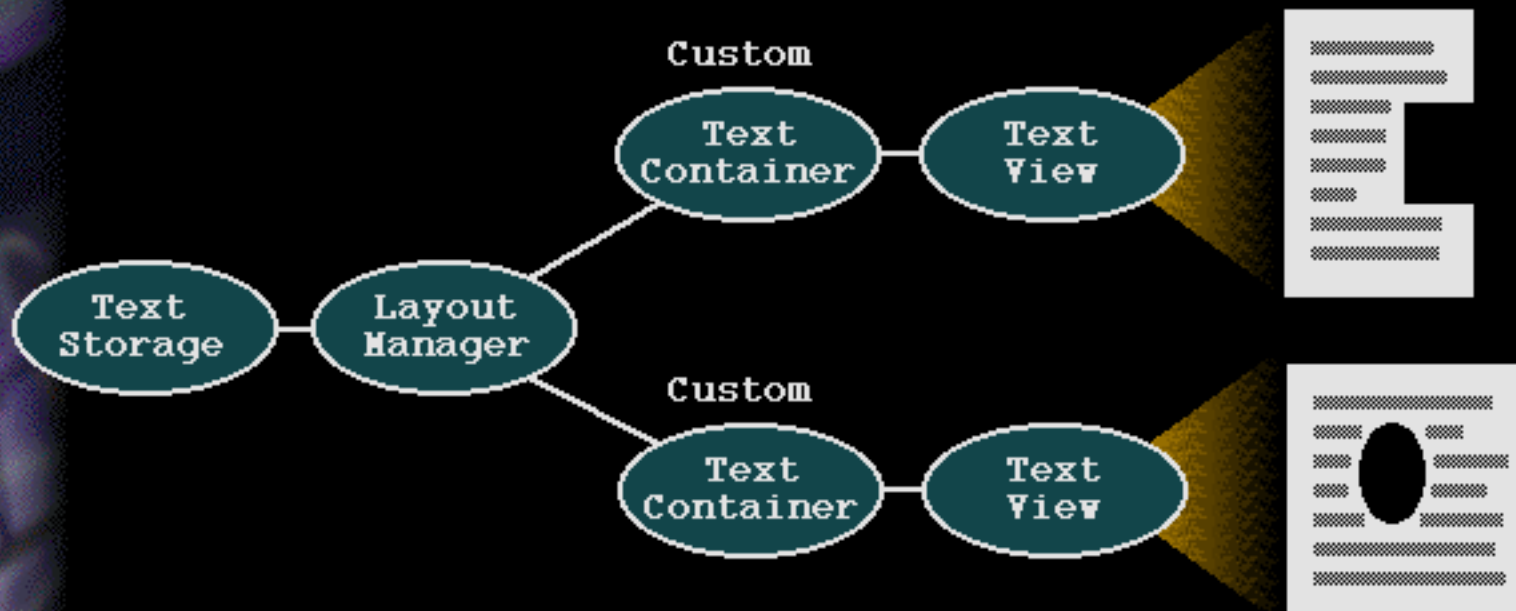
Text System Configurations

Multiple containers: Columns, pages, etc...



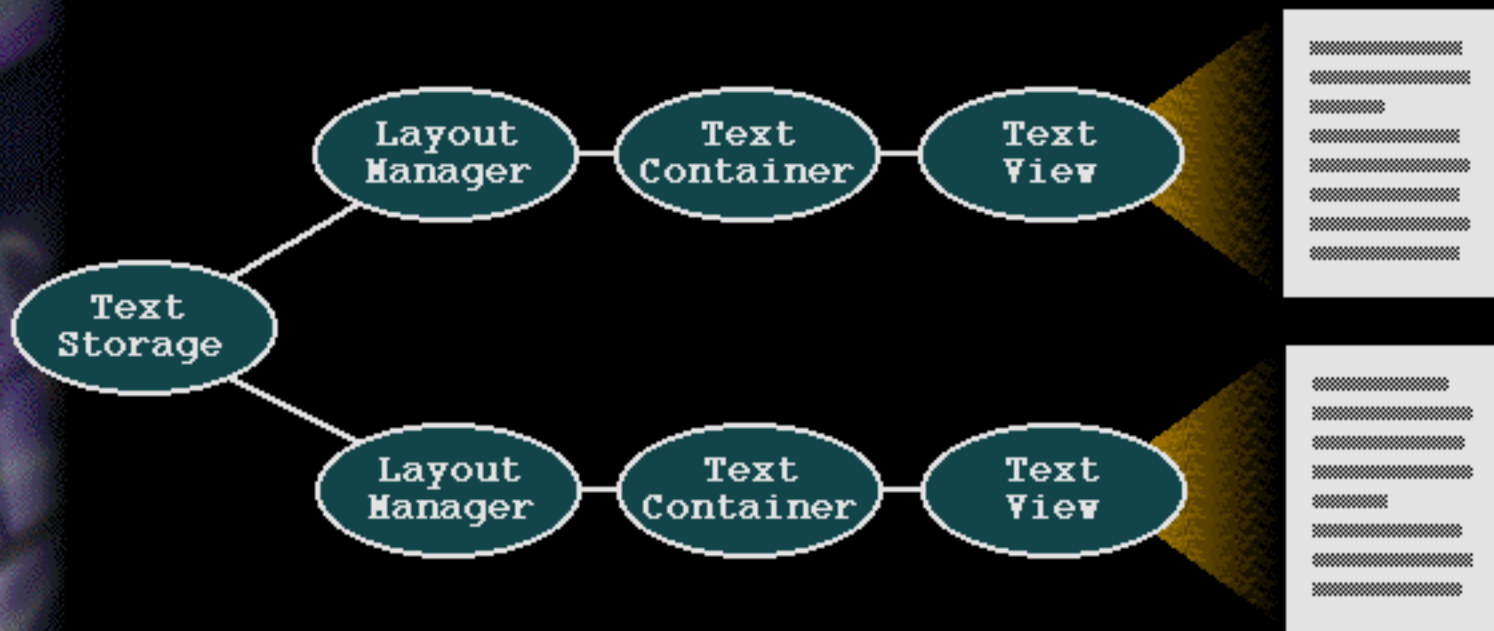
Text System Configurations

Non-rectangular containers



Text System Configurations

Multiple layouts: Split views of same text, etc...



Related Classes

- **NSFont, NSFontPanel, NSFontManager**
 - Provides font metrics
 - Does character-to-glyph conversion
 - Supports Type 1, TrueType
- **NSInputManager, NSInputServer**
 - Manages input methods
- **NSTypesetter**
 - Lays glyphs out in line fragments
- **NSKeyBindingManager**
 - Converts key events to commands



Event Propagation

1 Key
Event

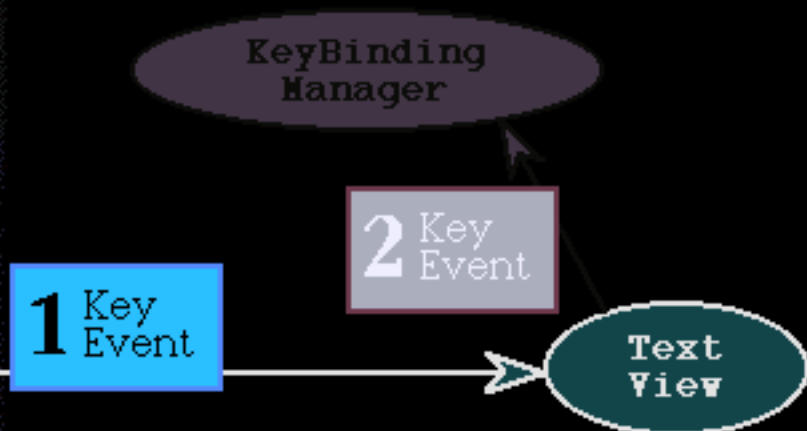
Text
View

```
graph LR; A[1 Key Event] --> B([Text View]);
```

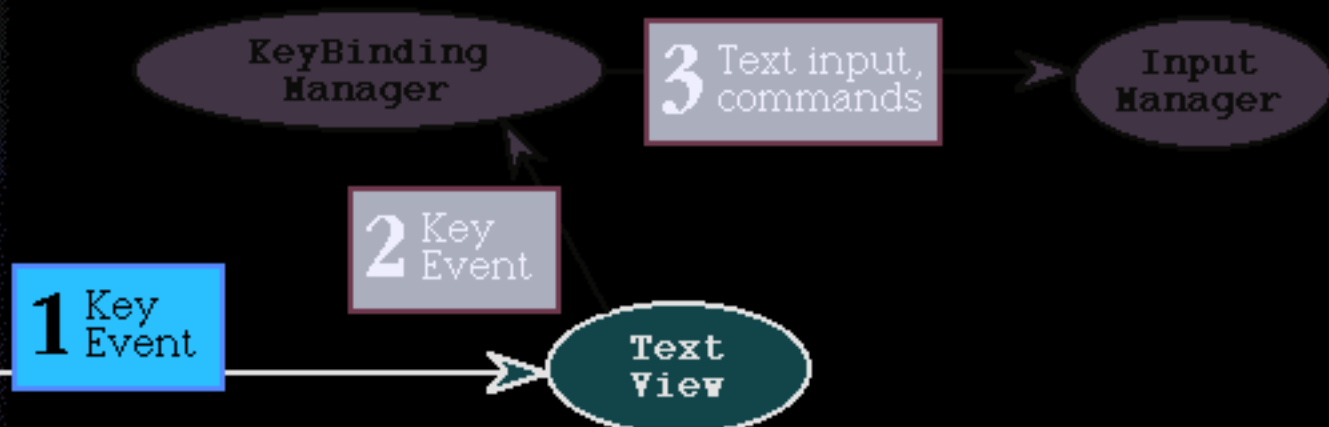
The diagram illustrates the first step of event propagation. A blue rectangular box on the left contains the text "1 Key Event". A white arrow points from this box to a dark teal oval on the right containing the text "Text View".



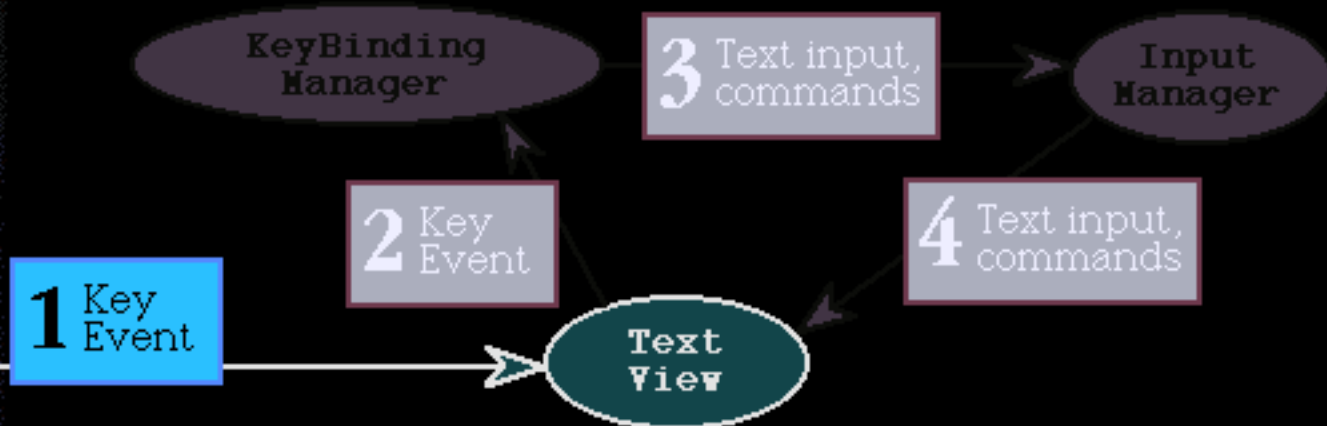
Event Propagation



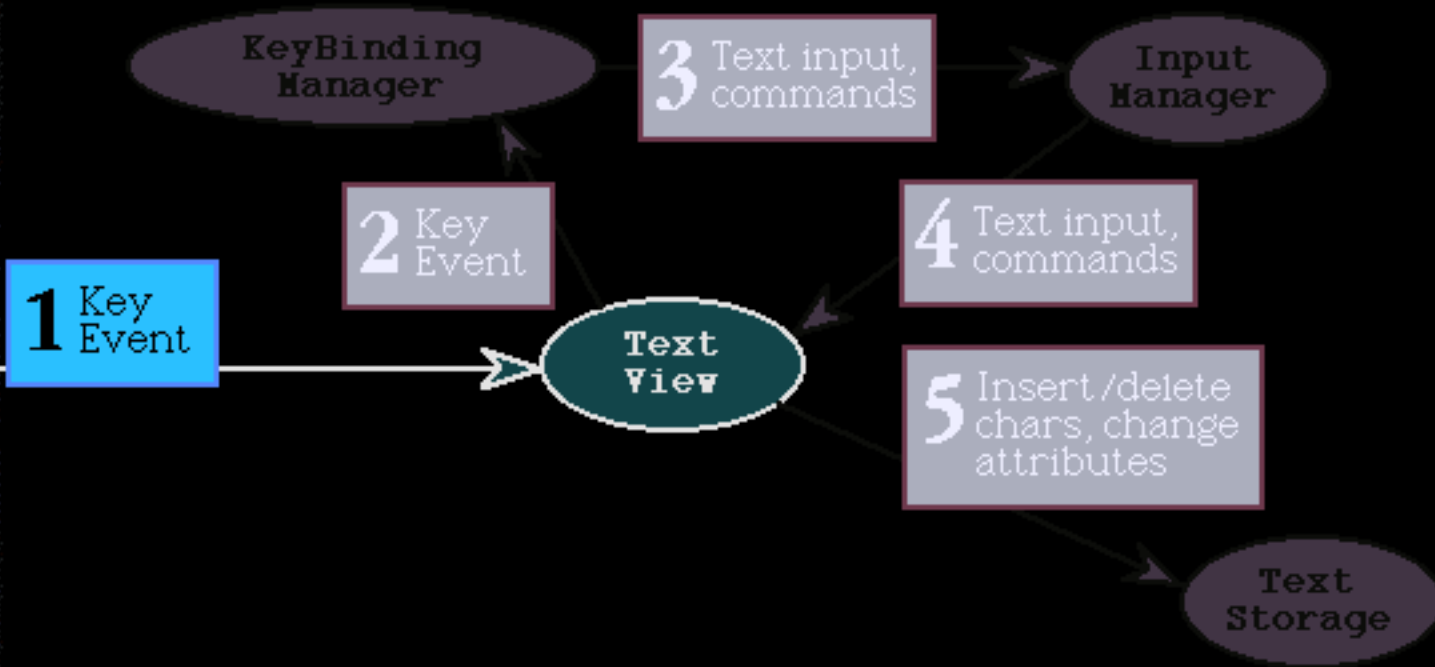
Event Propagation



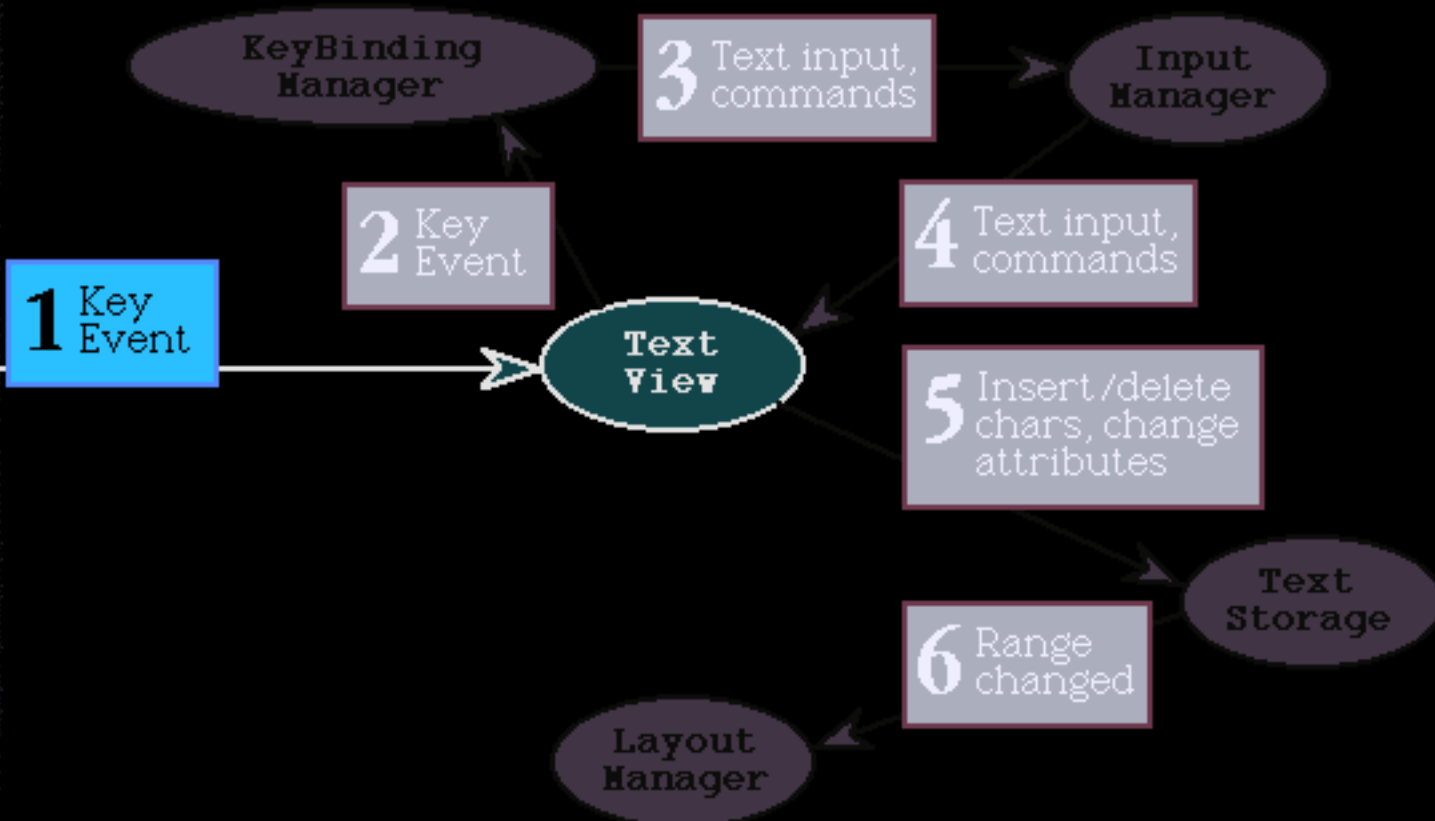
Event Propagation



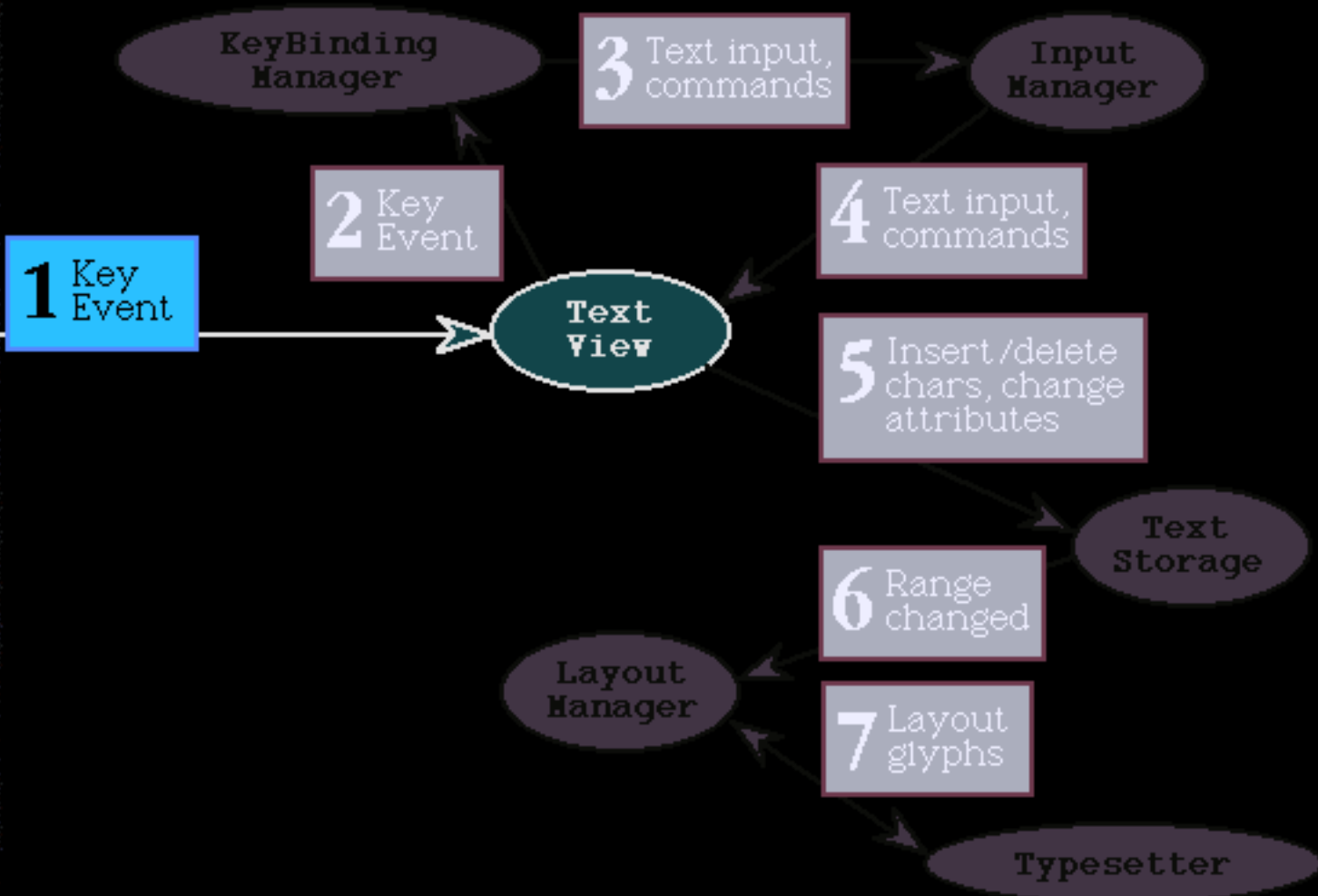
Event Propagation



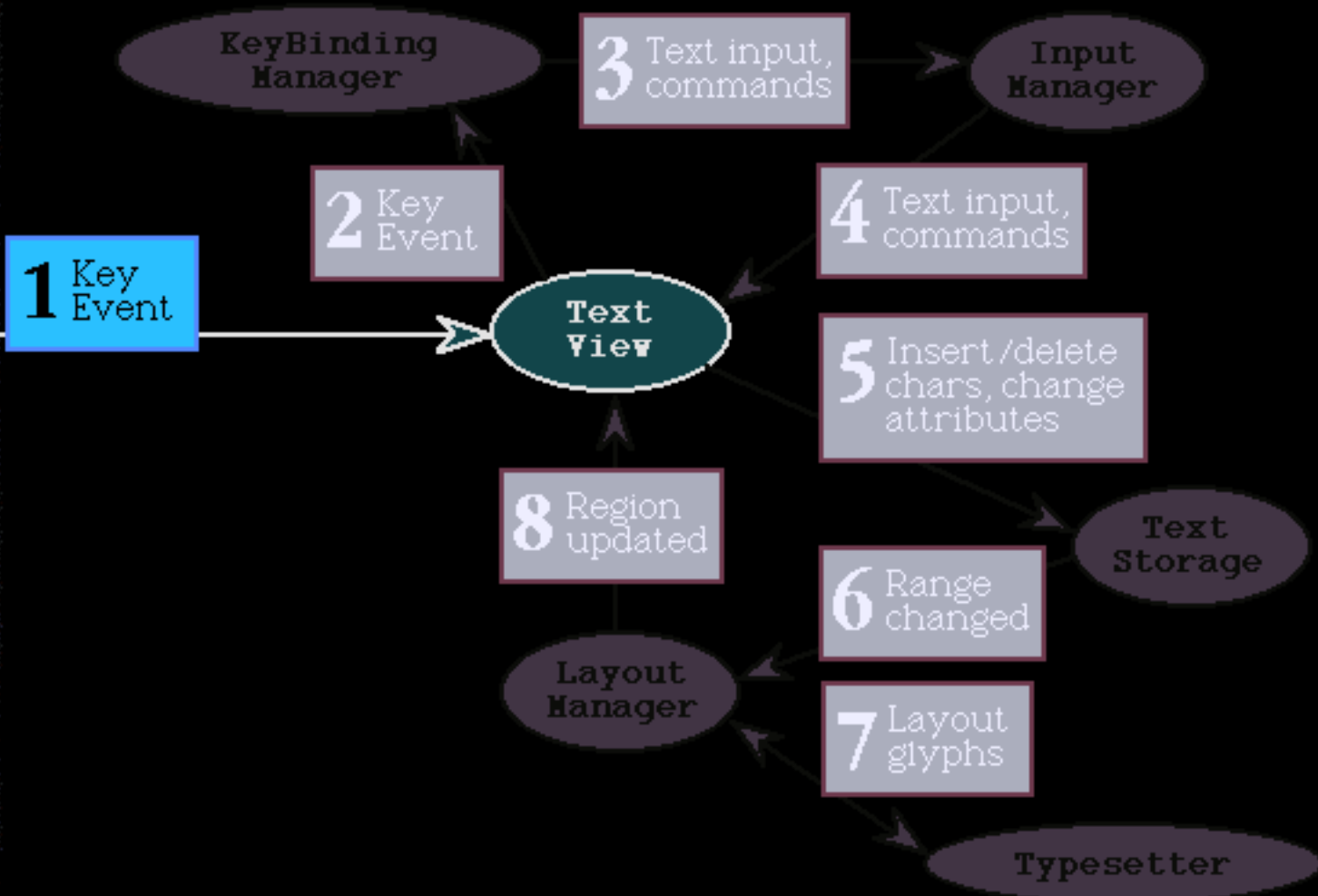
Event Propagation



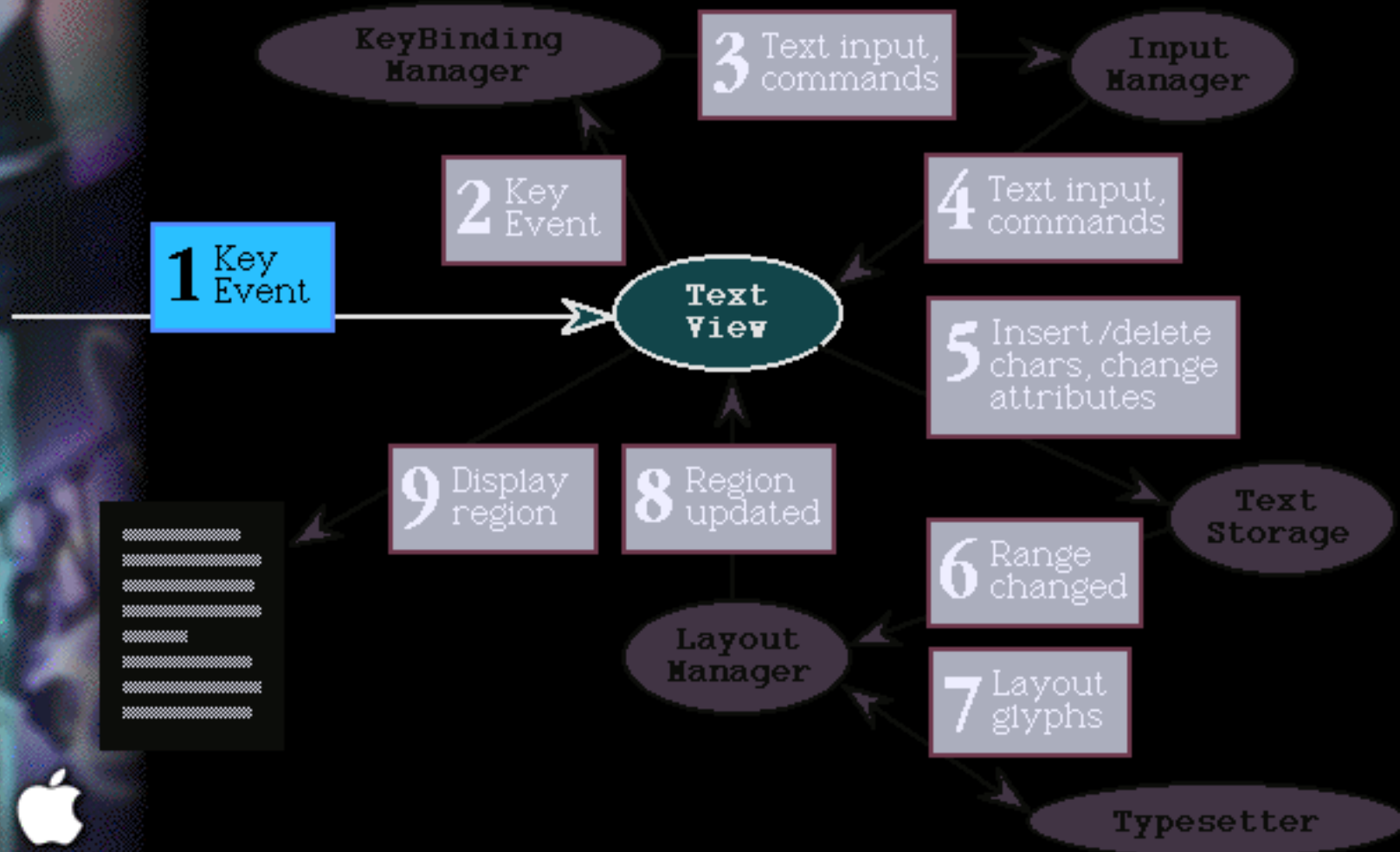
Event Propagation



Event Propagation

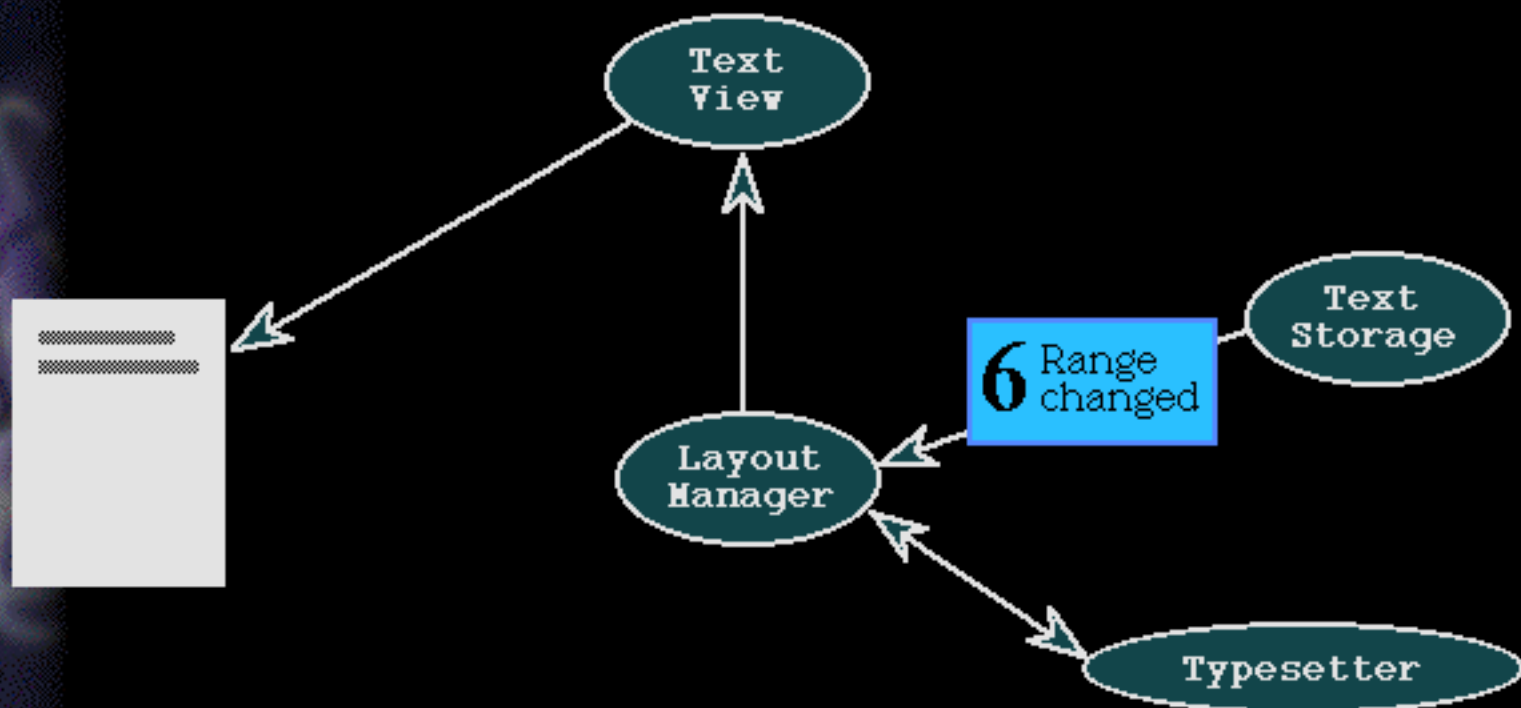


Event Propagation



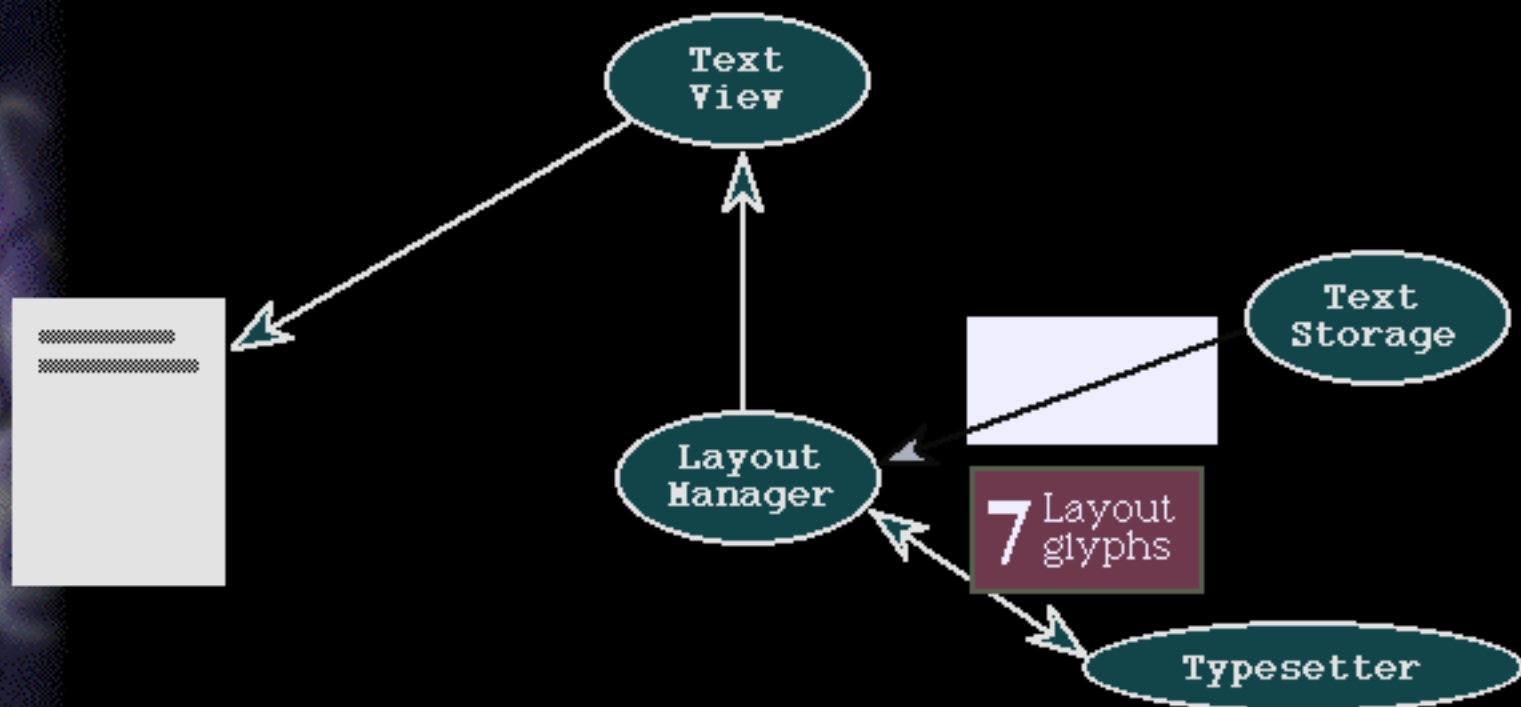
Event Propagation

Background Layout



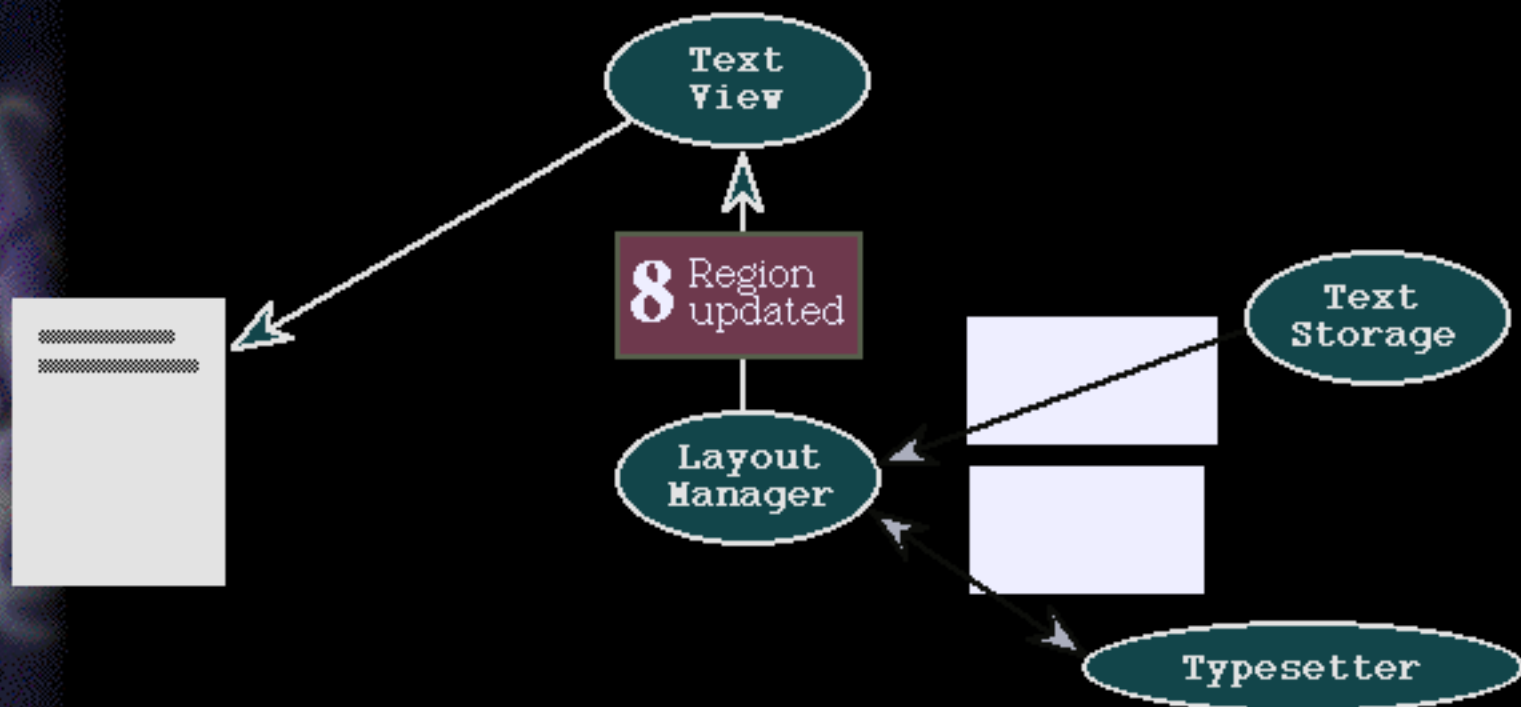
Event Propagation

Background Layout



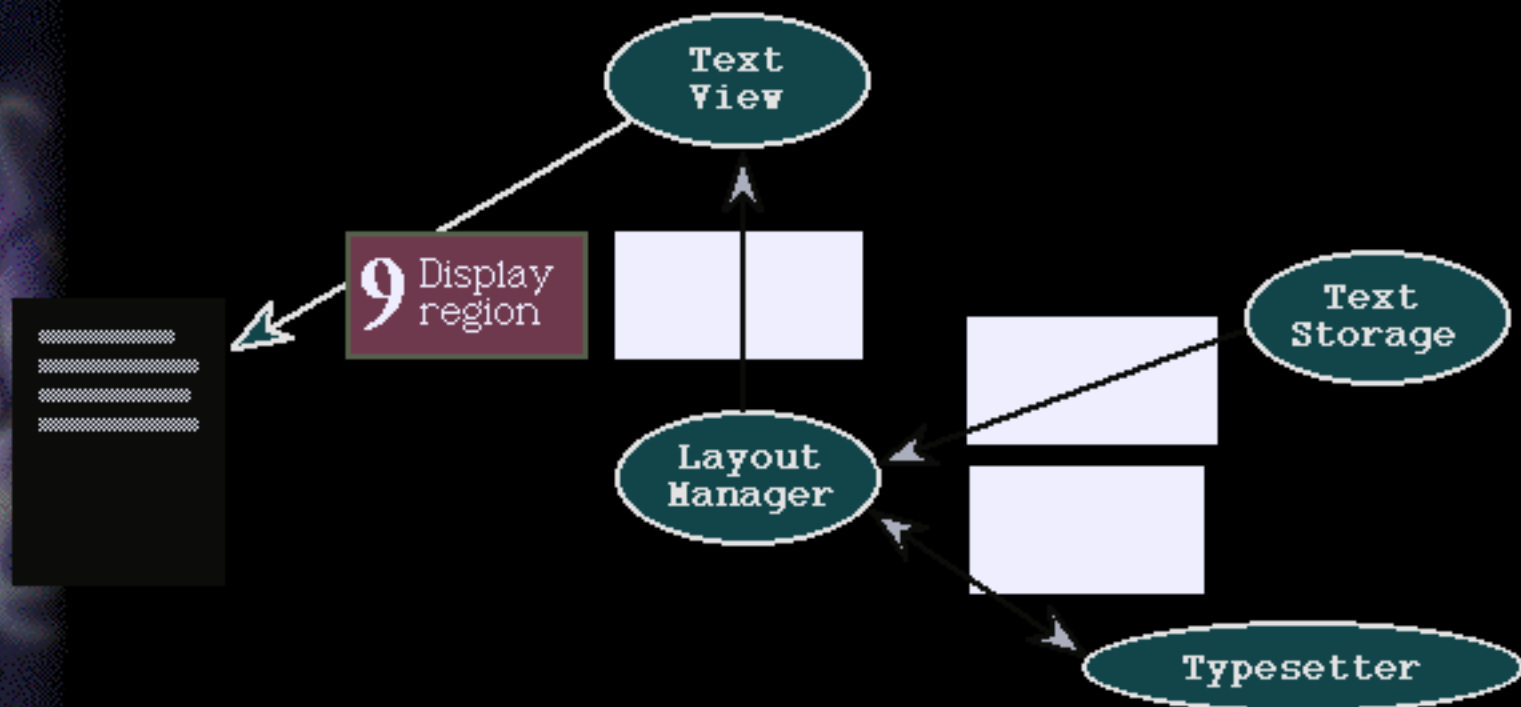
Event Propagation

Background Layout



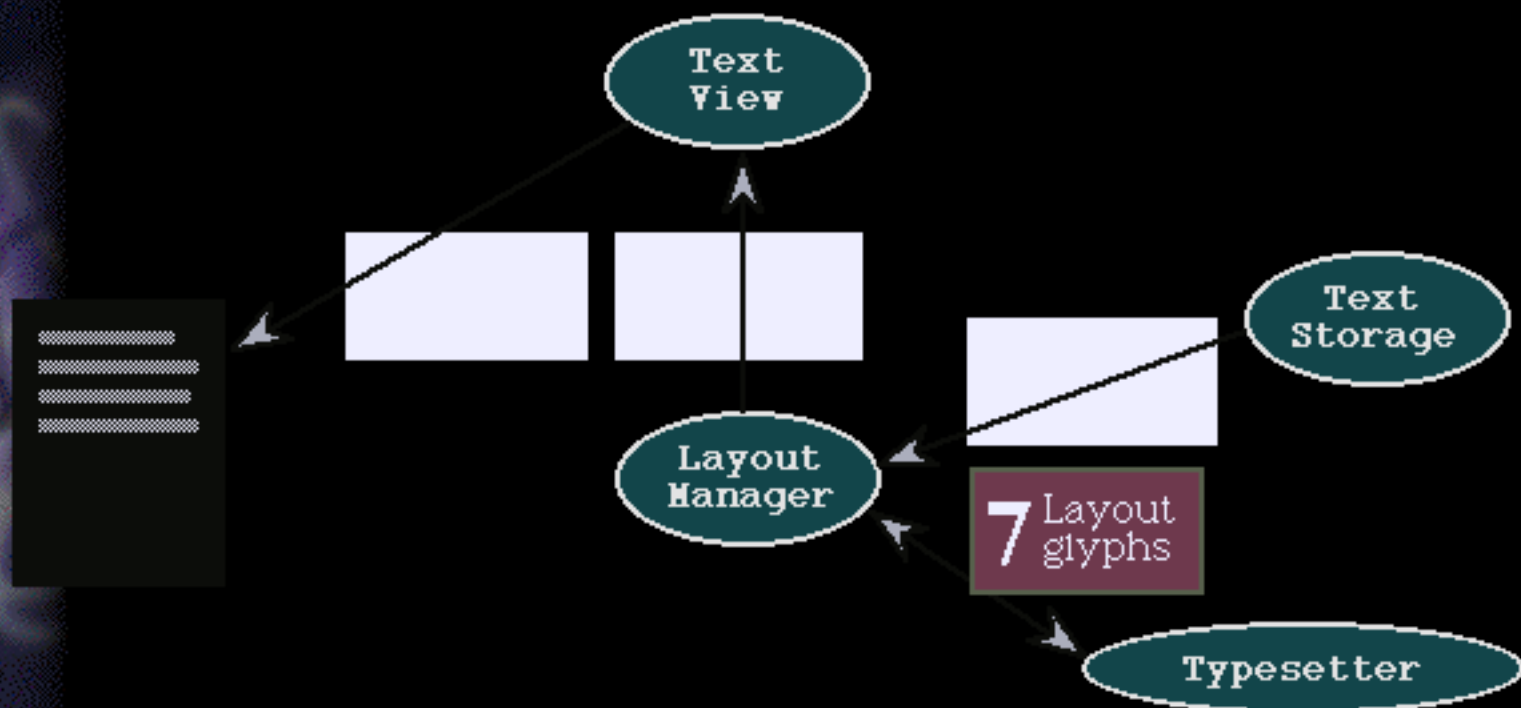
Event Propagation

Background Layout



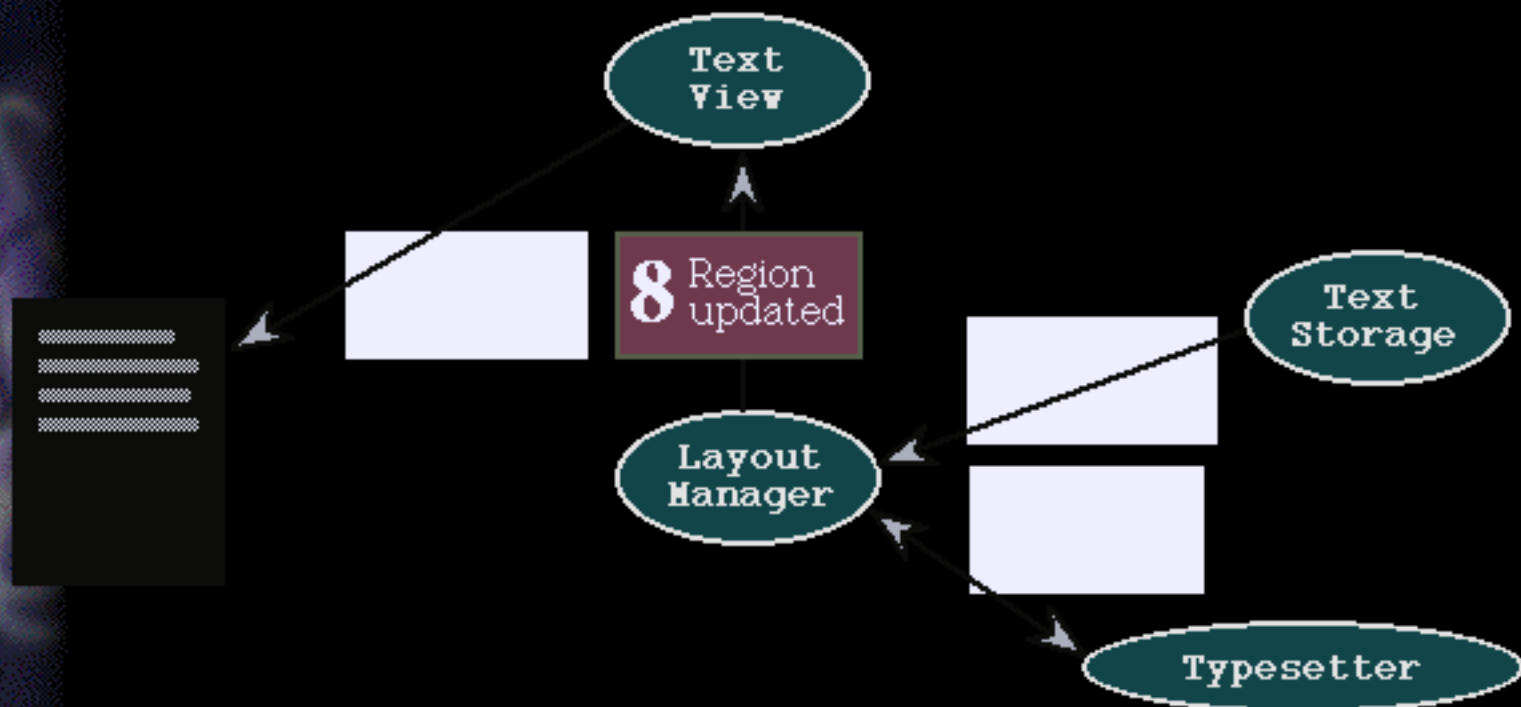
Event Propagation

Background Layout



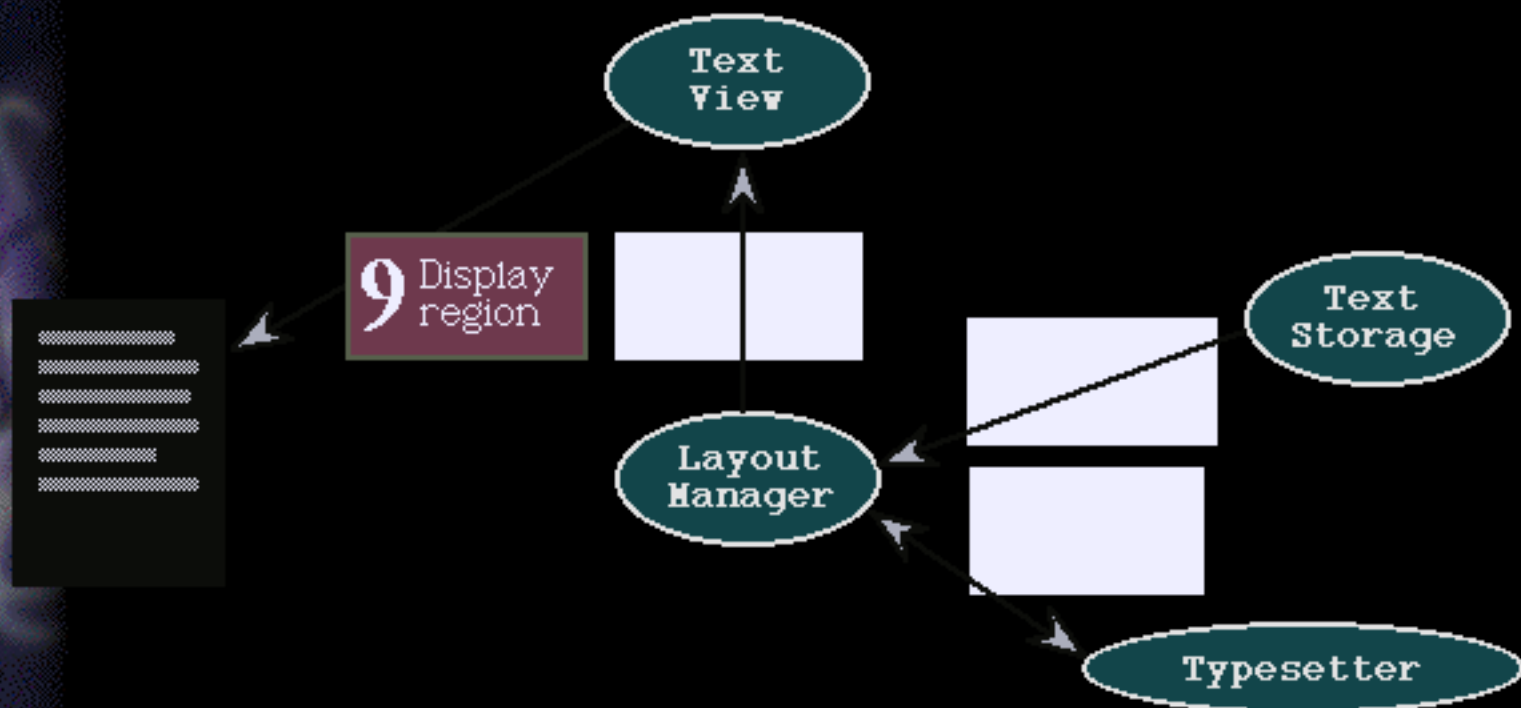
Event Propagation

Background Layout



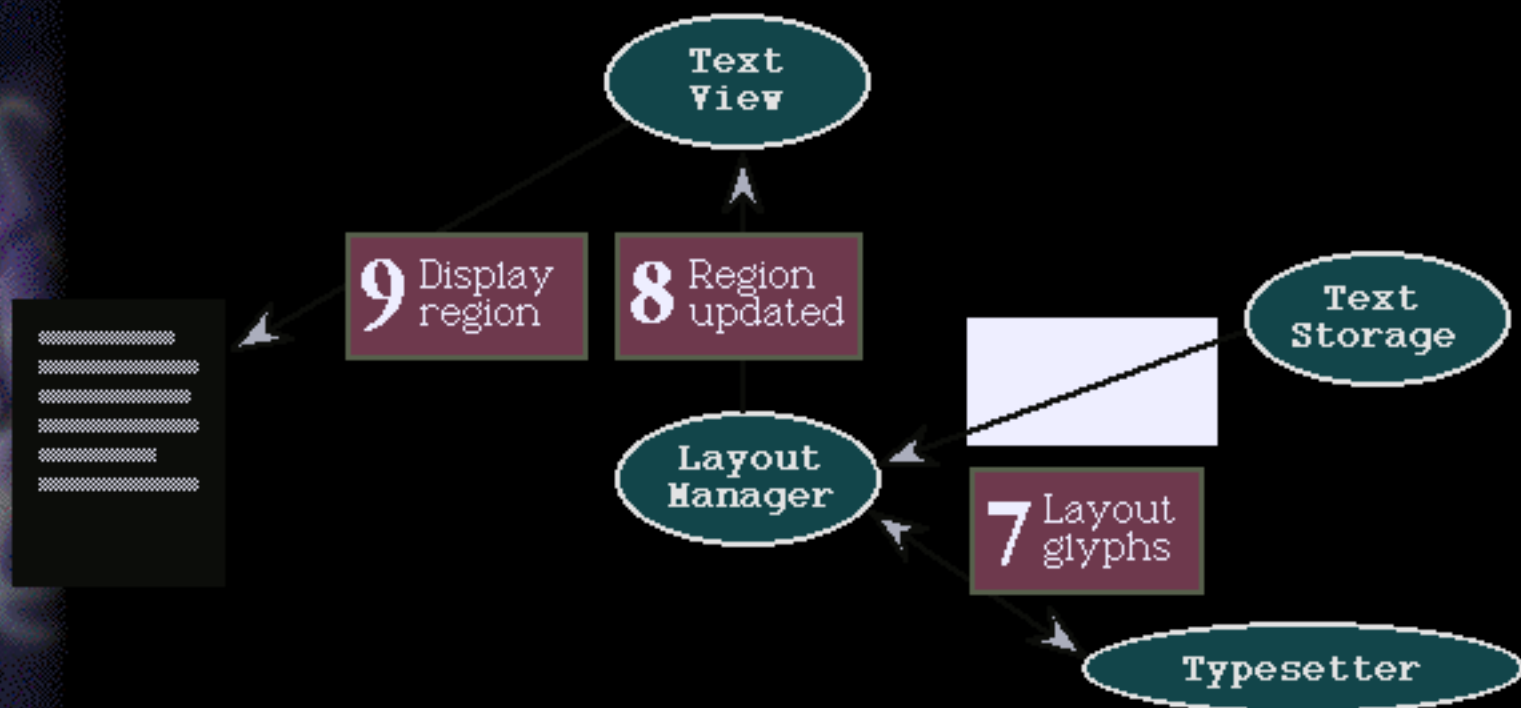
Event Propagation

Background Layout



Event Propagation

Background Layout



Future Directions

- **HTML support**
- **Track and support popular font formats**
- **Provide advanced GX typography**
- **Do bidirectional and vertical scripts out of the box**





Yellow Box Localization

Andy Daniels

**International,
Text and Graphics**

Localization Support Features

- **Multiple languages simultaneously**
- **Languages individually installable**
- **Language selection via user preferences**
 - Not true dynamic switching
- **Cross-platform**



Benefits—Reduced Footprint

Reduced Footprint



Benefits—Reduced Footprint

Reduced Footprint



Benefits—Reduced Footprint

Reduced Footprint



Benefits—Reduced Footprint

Reduced Footprint



Benefits—Reduced Footprint

Reduced Footprint



Benefits

Simple Incremental Localization

- **Easy to add and remove localizations**
- **User-installable**
- **Facilitates staggered releases**



Benefits

Multiple Switchable Localizations

- **Switch via user preference**
 - Ordered list of languages
- **Different users on the same computer can work in their native language**
- **Perfect for multi-user installations**
 - Multilingual offices, classrooms, language labs, even homes!



Benefits

SKU Consolidation

- **Flexibility**
 - Packages based on market groupings
 - Add on as release schedule allows



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SKU Consolidation

- **Flexibility**
 - Packages based on market groupings
 - Add on as release schedule allows
- **Cost**
 - Reduced qualification effort
 - Lower cost of goods, lower inventory, simpler distribution, thus...



Benefits

SKU Consolidation

- **Flexibility**
 - Packages based on market groupings
 - Add on as release schedule allows
- **Cost**
 - Reduced qualification effort
 - Lower cost of goods, lower inventory, simpler distribution, thus...
- **Greater profitability!**





Demo



Under the Covers

Application Bundle

Code

English

French

Japanese



Application Bundle



- Application is directory tree



Application Bundle



- **Application is directory tree**
 - Presented as single object by finder



Inside the Application Bundle

MyApp.app/



Inside the Application Bundle

MyApp.app/



- Code and other resources



Inside the Application Bundle

MyApp.app/



- Code and other resources
- Locale-specific pieces in *lproj* subdirectories



Inside the Application Bundle

MyApp.app/

MyApp



English.lproj



French.lproj



Japanese.lproj



- Code and other resources
- Locale-specific pieces in *lproj* subdirectories
 - One *lproj* per language



Typical Files in an *lproj*

- **Nib**—a super DITL
 - Window and dialog layout, labels, connections



Typical Files in an *lproj*

- **Nib—a super DITL**
 - Window and dialog layout, labels, connections
- **Strings file**
 - Messages generated by application
 - Key/value pairs



Typical Files in an *lproj*

- **Nib—a super DITL**
 - Window and dialog layout, labels, connections
- **Strings file**
 - Messages generated by application
 - Key/value pairs
- **Images, help files, html...**



Strings File

- Plain text
- Key/value pairs with comments
 - Keys are strings, not message IDs
- Can be generated from source code
 - `NSStringLocalizedString(key, comment)`



Sample Strings File

```
/* Greeting for the user */
"Hello" = "Bonjour";

/* Version string (major.minor) */
"Release %d.%d" = "Version %d.%d"

/* Message indicating file couldn't be found */
"Couldn't open file %@" =
    "Impossible d'ouvrir le fichier %@";

/* Example showing argument reordering */
"%@, couldn't open file %@" =
    "Impossible d'ouvrir le fichier %2$@ %1$@";
```



Installation

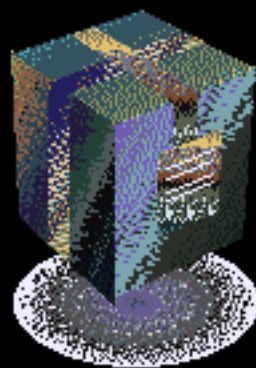


Installation



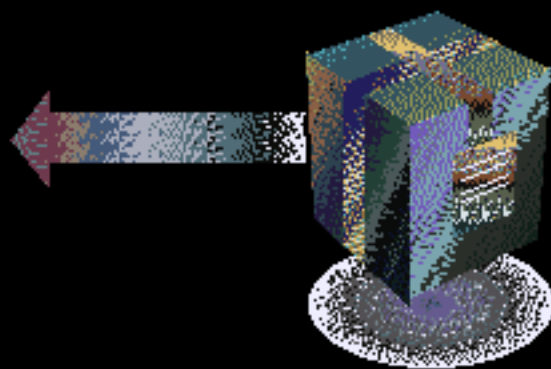
Installation

- Use standard Installer
- Package includes localized resources only



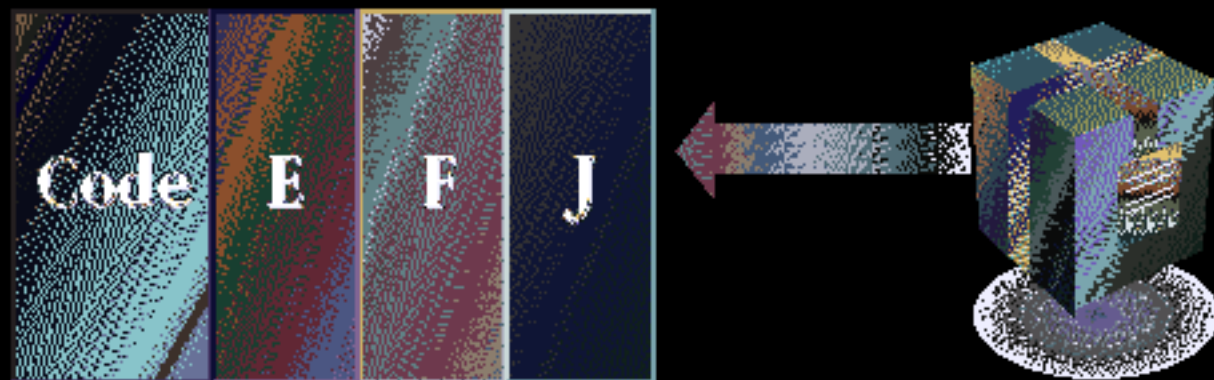
Installation

- Use standard Installer
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Installation

- Use standard Installer
- Package includes localized resources only



Aids to Localization

- Auto-generation of strings files
 - `NSString(key, comment)`
=> `genstrings filenames`
- Locked mode in Interface Builder
 - Won't let you break connections
- “Check” mode for applications
 - `NSShowNonLocalizableStrings`
 - `NSShowNonLocalizedStrings`
- AppleGlott support coming



What's There in OpenStep 4.2?

- **Example source code**
 - *TextEdit*, *TextSizingExample*, and *Ruler* in `/NextDeveloper/Examples/AppKit`
- **Documentation**
 - Class references, release notes
 - `/NextLibrary/Documentation/NextDev/`
`TasksAndConcepts/ProgrammingTopics/`
`TextOverview.rtf`
- **French and German Localizations**



For International Types at WWDC...

- **Lunch with Apple's International Engineers**
 - Thurs., 12:30–1:30, Hall 2, Find balloons!





Q&A

The background features a dark, textured surface with a glowing blue and purple globe. A white Apple logo is positioned at the top center, resting on a dark, rounded object. The text "Worldwide" is written in a golden, serif font with a slight shadow effect. The word "Developers" is enclosed in a white rectangular box with a thin black border, and is written in a white, serif font. The word "Conference" is written in the same golden, serif font as "Worldwide".

Worldwide

Developers

Conference