

<https://youtu.be/dnkcmDETeGg>

GNUstep

Conceptual Architecture

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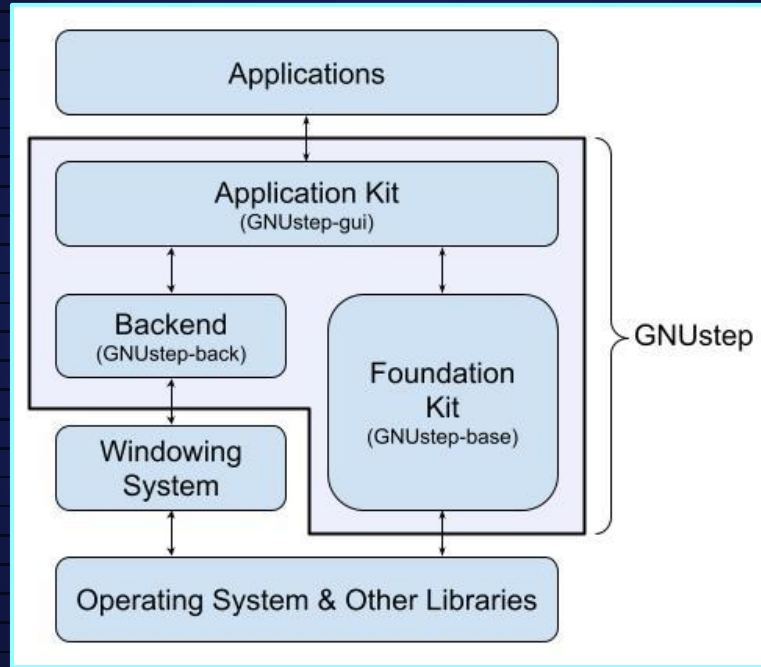
Lessons learned,
Conclusion and references

What is GNUstep?

GNUstep is an open source object-oriented development environment originally derived from the OPENstep API and utilizing the NEXTstep framework that provides the user with a large range of utilities and libraries for building large, cross-platform, applications and tools.



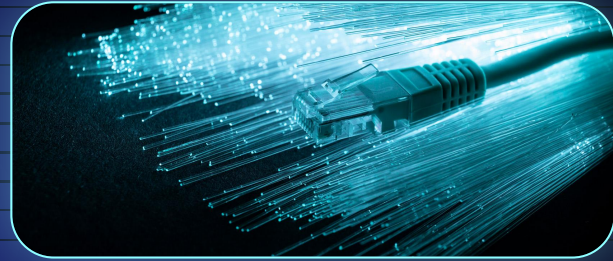
ARCHITECTURE



ARCHITECTURE

The Application Kit defines Graphical Objective C classes.

Application Kit



Foundation Kit

The Foundation Kit defines non-graphical Objective-C classes

ARCHITECTURE (contd.)

The Backend Subsystem is actually a series of libraries each designed for a specific windowing system.

Backend



EXTERNAL INTERFACES

Objective-C Runtime & Compiler

GNUstep, developed in Objective-C, compiles its code into machine code for execution. GNUstep-base handles communication with the Objective-C library.

Gorm

Gorm is an interface modeler that builds and implements items from the GNUstep GUI Library for creating graphical applications.

Windowing System

The Windowing System renders graphical applications on a computer screen.

COMPONENTS



Libs-Base

This library is responsible for some of the fundamental actions for an application



Libs-Back

This library is responsible in handling rendering and events for the gui library



Libs-gui

This library is responsible for frontend processes related to gui.

SYSTEM EVOLUTION

Libs-Base

Version History

- Ver. 0.1.19(Expanded classes and reorganized structure)
- Ver. 0.5.5(Rewritten NeXTstep classes for enhanced performance and usability)
- Ver. 1.15.4(Improved MacOS compatibility)
- Ver. 1.23.0(Added Objective-C 2.0 support with ARC)
- Ver. 1.31.0(Ongoing runtime improvements)

Libs-Gui

Version History

- Ver. 0.1(Enhanced GUI elements, system color configuration, and improved compatibility)
- Ver. 0.2(Optimized printing, auto-saving in documents, and better MacOS compatibility)
- Ver. 0.32(Introduced unique application icons, improved mouse tracking)

Gorm

Version History

- Ver. 0.1(Introduced core UI functions)
- Ver. 0.5(Added sound and image support with enhanced multi-selection and performance.)
- Ver. 1.0(Improved usability with menu restoration, alert panels, enhanced font widgets, cut/paste, and alignment tools)
- Ver. 1.4(Simplified matrix creation)

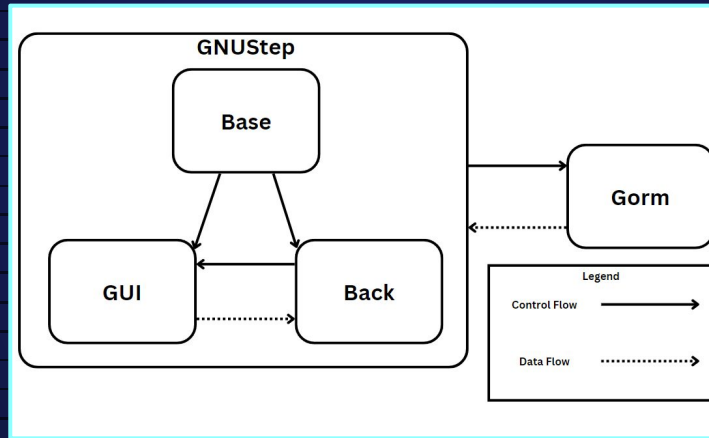
DATA & FLOW CONTROL

Base

The Base library has control flow over the Back and GUI library

GUI

The GUI library sends data to the Back library



Back

The Back library has control flow over the GUI library

Gorm

This application sends data into the GNUStep API, and is controlled by the GNUStep API

CONCURRENCY



Instances

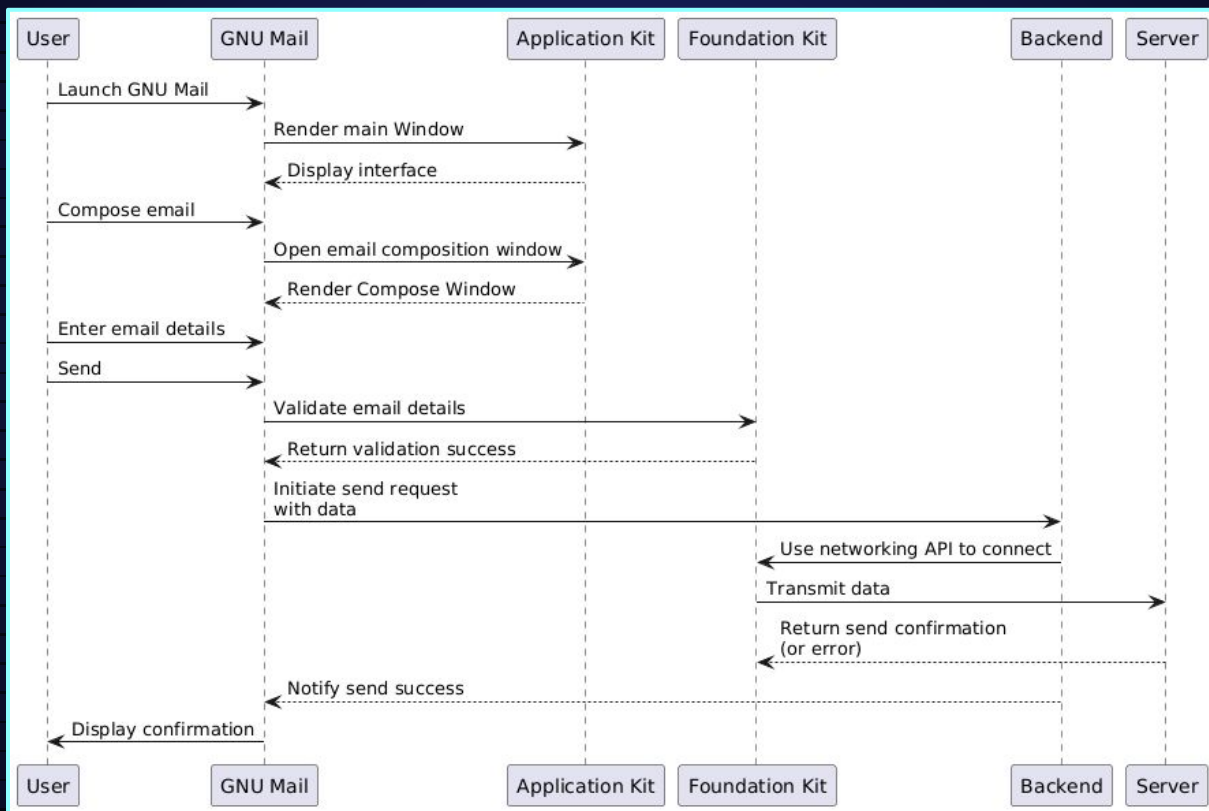
Gorm interacts with the GNUstep API, causing multiple libraries to execute concurrently.



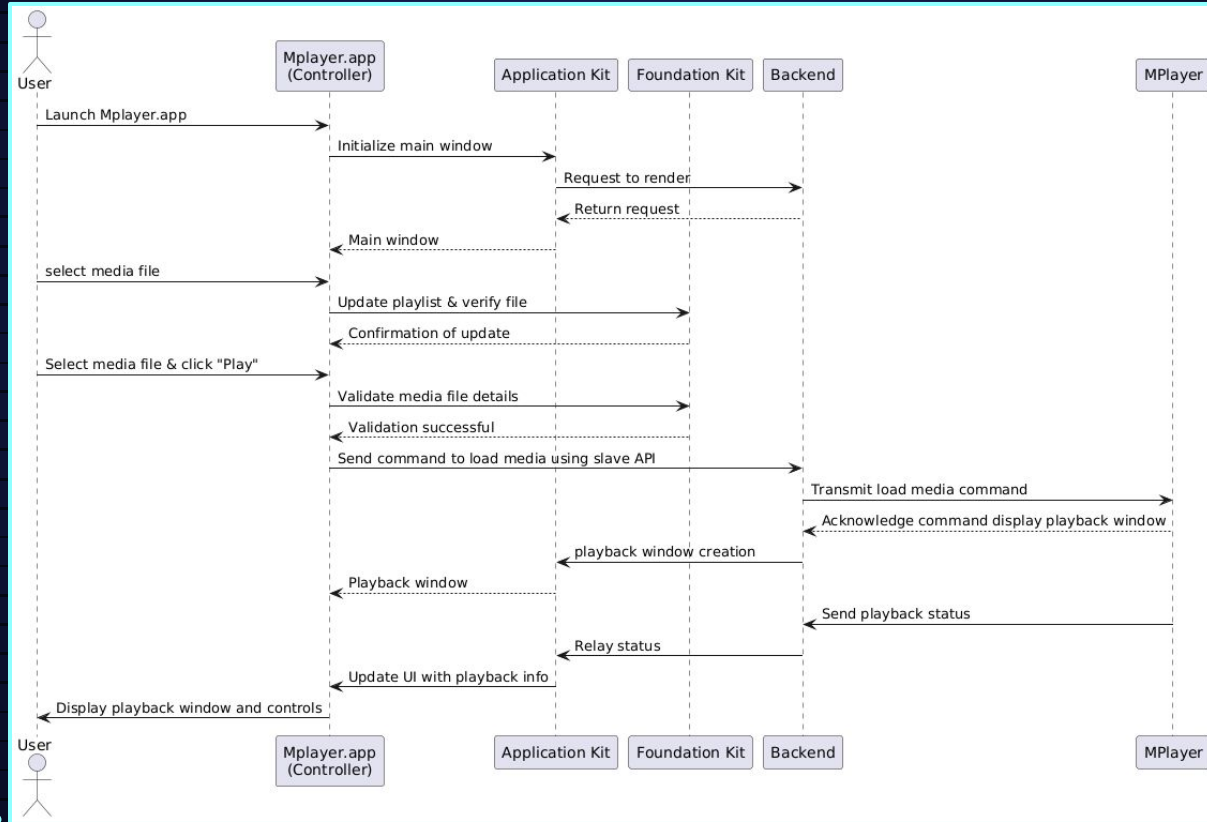
Purpose

GNUstep's design necessitates asynchronous library execution, introducing concurrency even in single-threaded processes.

USE CASES: GNU Mail



USE CASES: Mplayer





Data Dictionary

Framework

Bundle

Plug-in

Loadable
bundle

Palette

Application

Tool



Naming Conventions

GS/GC

GSXML

GSHtml

GSMime

GSLazy

GORM

CONCLUSION

GNUstep's architecture is made up of 3 main subsystems: **Application Kit**, **Foundation Kit**, and **Backend library**.

Based on the **NeXTSTEP framework**, GNUstep also interacts with external interfaces like the Gorm application for GUI creation.

Due to outdated documentation, **we propose updating the resources to better explain the system architecture.**

